

## N O T I C E

THIS DOCUMENT HAS BEEN REPRODUCED FROM  
MICROFICHE. ALTHOUGH IT IS RECOGNIZED THAT  
CERTAIN PORTIONS ARE ILLEGIBLE, IT IS BEING RELEASED  
IN THE INTEREST OF MAKING AVAILABLE AS MUCH  
INFORMATION AS POSSIBLE



DEPARTMENT OF ELECTRICAL ENGINEERING  
SCHOOL OF ENGINEERING  
OLD DOMINION UNIVERSITY  
NORFOLK, VIRGINIA

AIRBORNE ANTENNA PATTERN CALCULATIONS

(NASA-CR-165059) AIRBORNE ANTENNA PATTERN  
CALCULATIONS Final Report, 1 Nov. 1980 - 31  
Oct. 1981 (Old Dominion Univ., Norfolk, Va.)  
322 p HC A14/MP A01

N82-15277

CSSL 20N

Unclas

G3/32 08710

By

Timothy J. Knerr

Teri M. Owens

and

Roland R. Mielke, Principal Investigator

Final Report

For the period November 1, 1980 - October 31, 1981

Prepared for the  
National Aeronautics and Space Administration  
Langley Research Center  
Hampton, Virginia

Under  
Research Grant NSG 1655  
Melvin C. Gilleath, Technical Monitor  
Flight Electronics Division

December 1981

DEPARTMENT OF ELECTRICAL ENGINEERING  
SCHOOL OF ENGINEERING  
OLD DOMINION UNIVERSITY  
NORFOLK, VIRGINIA

AIRBORNE ANTENNA PATTERN CALCULATIONS

By

Timothy J. Knerr

Teri M. Owens

and

Roland R. Mielke, Principal Investigator

Final Report

For the period November 1, 1980 - October 31, 1981

Prepared for the  
National Aeronautics and Space Administration  
Langley Research Center  
Hampton, Virginia 23665

Under  
Research Grant NSG 1655  
Melvin C. Gilreath, Technical Monitor  
Flight Electronics Division



Submitted by the  
Old Dominion University Research Foundation  
P.O. Box 6369  
Norfolk, Virginia 23508-0369

December 1981

PRECEDING PAGE BLANK NOT FILMED

ABSTRACT

Calculated principal and off-principal plane patterns are presented for the following aircraft: de Havilland DHC-7, Rockwell Sabreliner 75A, Piper PA-31T Cheyenne, Lockheed Jet Star II, Piper PA-31-350 Navajo Chieftain, Beechcraft Duke B60, Rockwell Commander 700, Cessna Citation III, Piper PA-31P Pressurized Navajo, Lear Jet, and Twin Otter DHC-6.

PRECEDING PAGE BLANK NOT FILMED

ACKNOWLEDGMENT

The authors gratefully acknowledge the guidance, help, and encouragement of Mr. Melvin C. Gilreath of the Flight Electronics Division of NASA/Langley Research Center throughout the grant period.

PRECEDING PAGE BLANK NOT FILMED

TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT . . . . .	iii
ACKNOWLEDGMENT . . . . .	v
I. INTRODUCTION . . . . .	1
II. AIRCRAFT ANTENNA PATTERN CALCULATIONS. . . . .	2
II.1. Introduction . . . . .	2
II.2. deHavilland DHC-7 . . . . .	2
II.3. Rockwell Sabreliner 75A . . . . .	72
II.4. Piper PA-31T Cheyenne . . . . .	111
II.5. Lockheed Jet Star II . . . . .	151
II.6. Piper PA-31-350 Navajo Chieftain . . . . .	174
II.7. Beechcraft Duke B60 . . . . .	201
II.8. Rockwell Commander 700 . . . . .	224
II.9. Cessna Citation III . . . . .	247
II.10. Piper PA-31P Pressurized Navajo . . . . .	264
II.11. Lear Jet . . . . .	281
II.12. Twin Otter DHC-6 . . . . .	297
REFERENCES . . . . .	317

# AIRBORNE ANTENNA PATTERN CALCULATIONS

By

Timothy J. Knerr<sup>1</sup>, Teri M. Owens<sup>1</sup>, and Roland R. Mielke<sup>2</sup>

## I. INTRODUCTION

The new computer code based on programs NMOD, PFLT, NPLOT, and OSUVOL has been used during the past year to investigate aircraft antenna patterns that were not available under the old code, known as the Volumetric Pattern Analysis Program. Roll, elevation, and off-principal plane patterns have been calculated for large and small aircraft. A description and definition of input data and an example of the programs in the new code are presented in an earlier progress report (ref. 1).

Chapter II presents output data from the new computer code for a number of general aviation aircraft. Readers interested in results for other large and small commercial aircraft are referred to previous reports on this project (refs. 1 to 6). Aircraft model data sets, the three views of the model, and the resulting patterns are presented. Further descriptions of the pattern cuts and any other necessary information are included in each subsection of this chapter.

---

<sup>1</sup> Graduate Research Assistant, Department of Electrical Engineering, Old Dominion University, Norfolk, Virginia 23508.

<sup>2</sup> Associate Professor, Department of Electrical Engineering, Old Dominion University, Norfolk, Virginia 23508.

## II. AIRCRAFT ANTENNA PATTERN CALCULATIONS

### II.1. Introduction

In this section the results of pattern calculations are presented for the deHavilland DHC-7, Rockwell Sabreliner 75A, Piper PA-31T Cheyenne, Lockheed Jet Star II, Piper PA-31-350 Navajo Chieftain, Beechcraft Duke B60, Rockwell Commander 700, Cessna Citation III, Piper PA-31P Pressurized Navajo, Lear Jet, and Twin Otter DHC-6. A model data set is given for each modeling attempt of the aircraft. This is followed by a three-view drawing of the resulting aircraft model compared to the original aircraft views. Then the calculated radiation pattern is presented.

### II.2. deHavilland DHC-7

Elevation, roll, and off-principal plane patterns are calculated for five particular antenna locations of this aircraft. Various modeling attempts are made for some antenna locations.



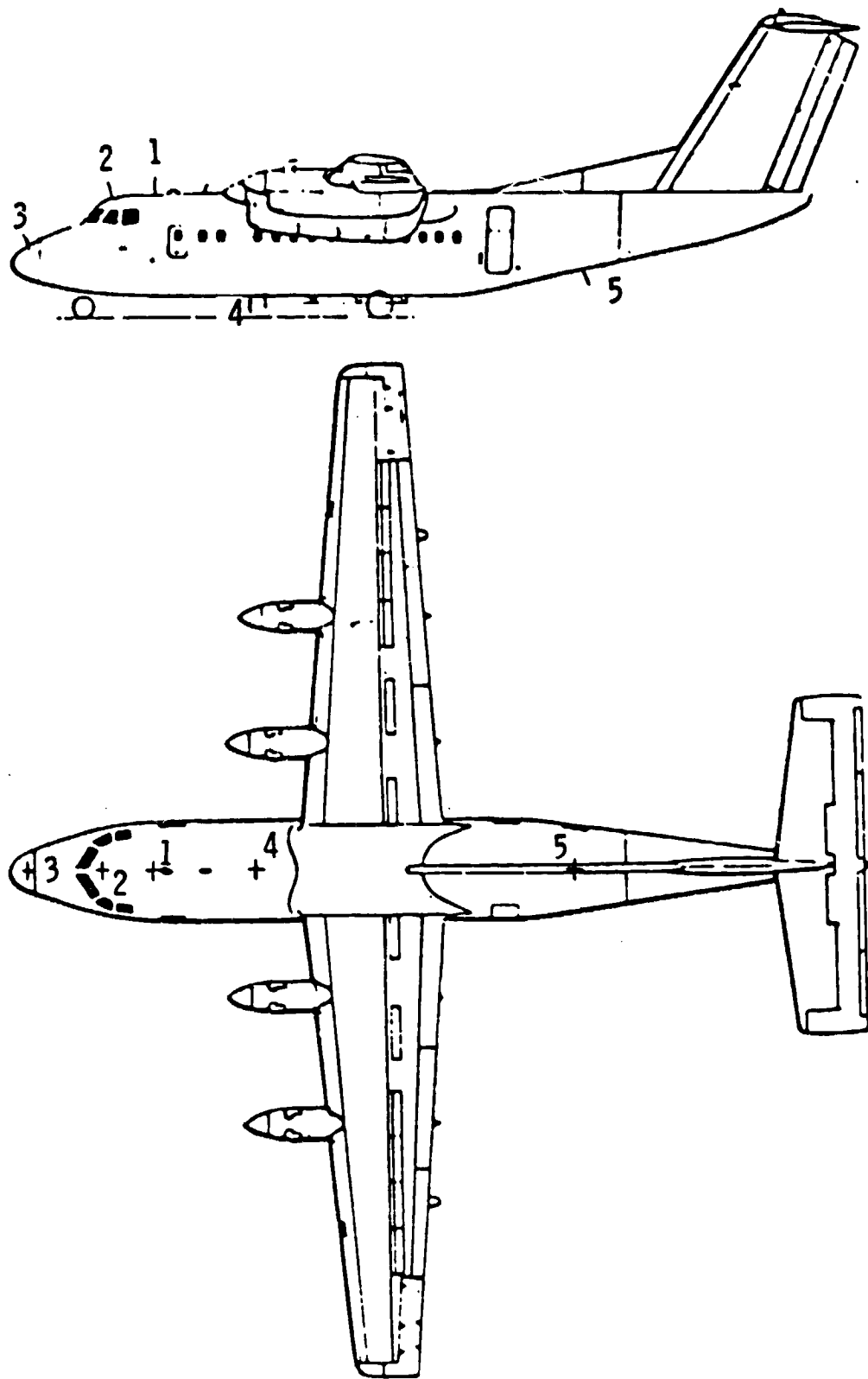


Figure II.1. deHavilland DHC-7. Antenna locations.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
45.86 37.76 65.38 847.92  
0. 0. 0.  
PG  
4 T  
39.93 -198.44 53.24  
54.45 -232.32 53.24  
54.45 -232.32 -53.24  
39.93 -198.44 -53.24  
PG  
4 T  
9.68 -773.35 10.31  
194.81 -860.47 7.26  
205.7 -745.52 0.  
21.78 -607.58 0.  
PG  
4 T  
21.78 -607.58 0.  
205.7 -745.52 0.  
194.81 -860.47 -7.26  
9.68 -773.35 -10.31  
SG  
1  
-45.80692944464 0.  
0. 0. 0. 25 3  
1. 0.  
PD  
0. 0. 89.9  
0 360 1  
50000. 5.  
PP  
3.75 3  
EX

Figure II.2-1. deHavilland DHC-7. Data set for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

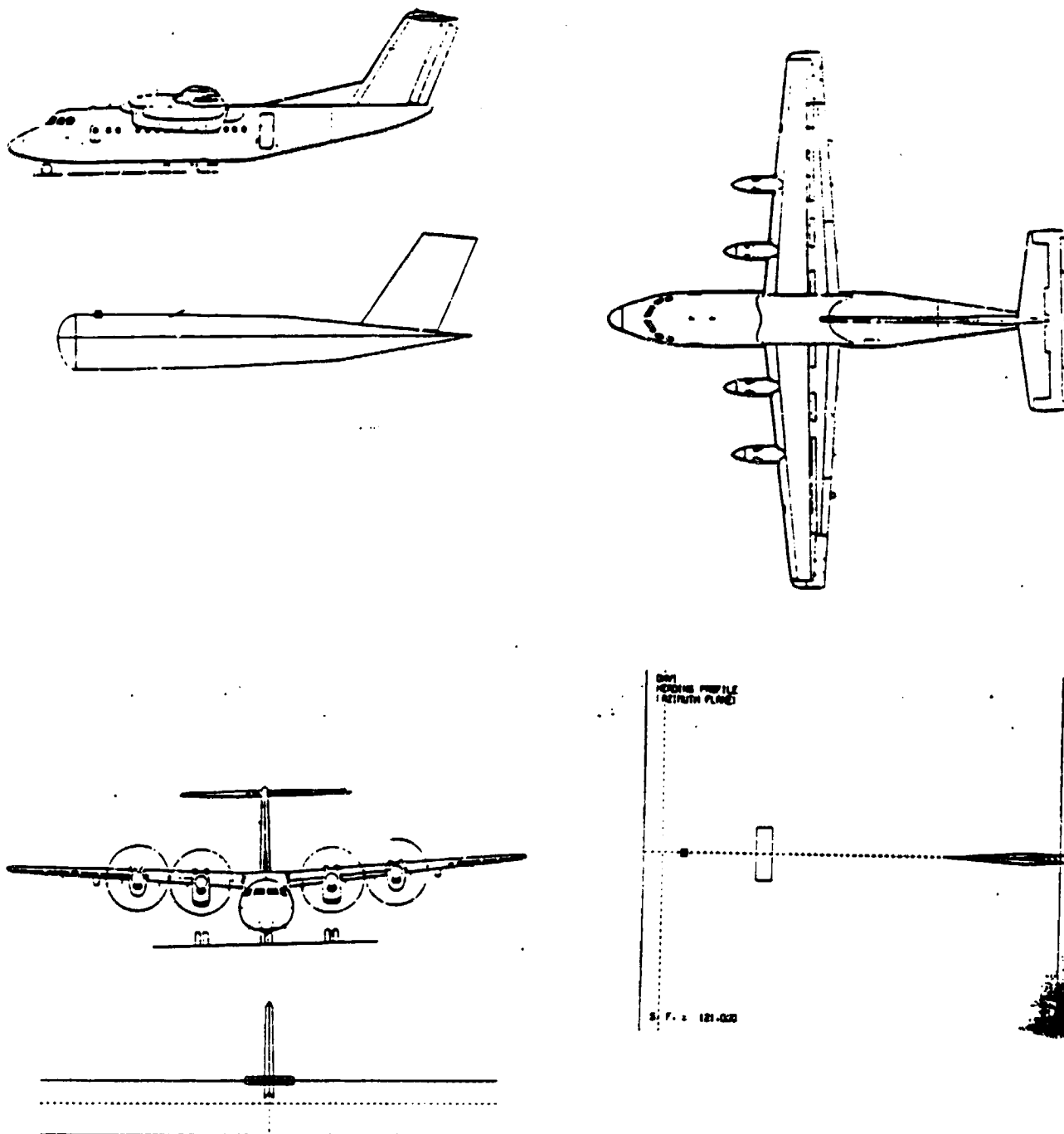


Figure II.2-2. deHavilland DHC-7. Top front 1/4 wavelength monopole antenna above cockpit at antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

E-PHI  
DB PLOT

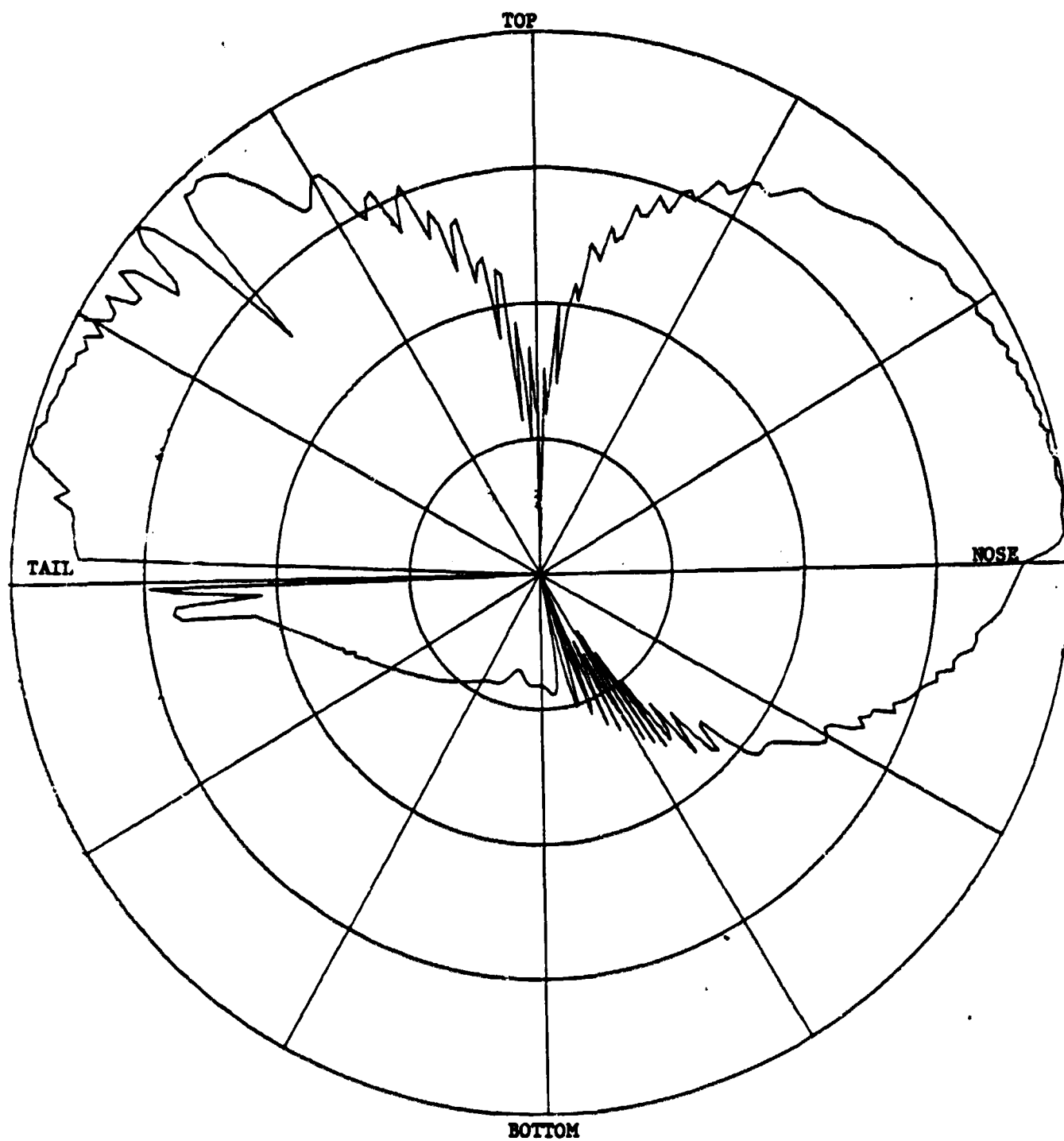


Figure II.2-3. deHavilland DHC-7. Elevation plane  
pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
45.86 37.76 69.38 847.92
0. 0. 0.
PG
4 T
39.93 -198.44 53.24
54.45 -232.32 53.24
54.45 -232.32 -53.24
39.93 -198.44 -53.24
PG
4 T
9.68 -773.35 10.31
194.81 -860.47 7.26
205.7 -745.52 0.
21.78 -607.58 0.
PG
4 T
21.78 -607.58 0.
205.7 -745.52 0.
194.81 -860.47 -7.26
9.68 -773.35 -10.31
PG
4 F
194.81 -860.47 7.26
194.81 -860.47 181.5
203.74 -766.2 181.5
205.7 -745.52 0.
PG
4 F
205.7 -745.52 0.
203.74 -766.2 -181.5
194.81 -860.47 -181.5
194.81 -860.47 -7.26
SG
1
-45.8069294464 0.
0. 0. 0. .25 3
1. 0.
PD
0. 270. 89.9
0 360 1
50000. 5.
PP
3.75 3
EX

```

Figure II.3-1. d<sup>00</sup>avilland DHC-7. Data set  
with T-tail for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

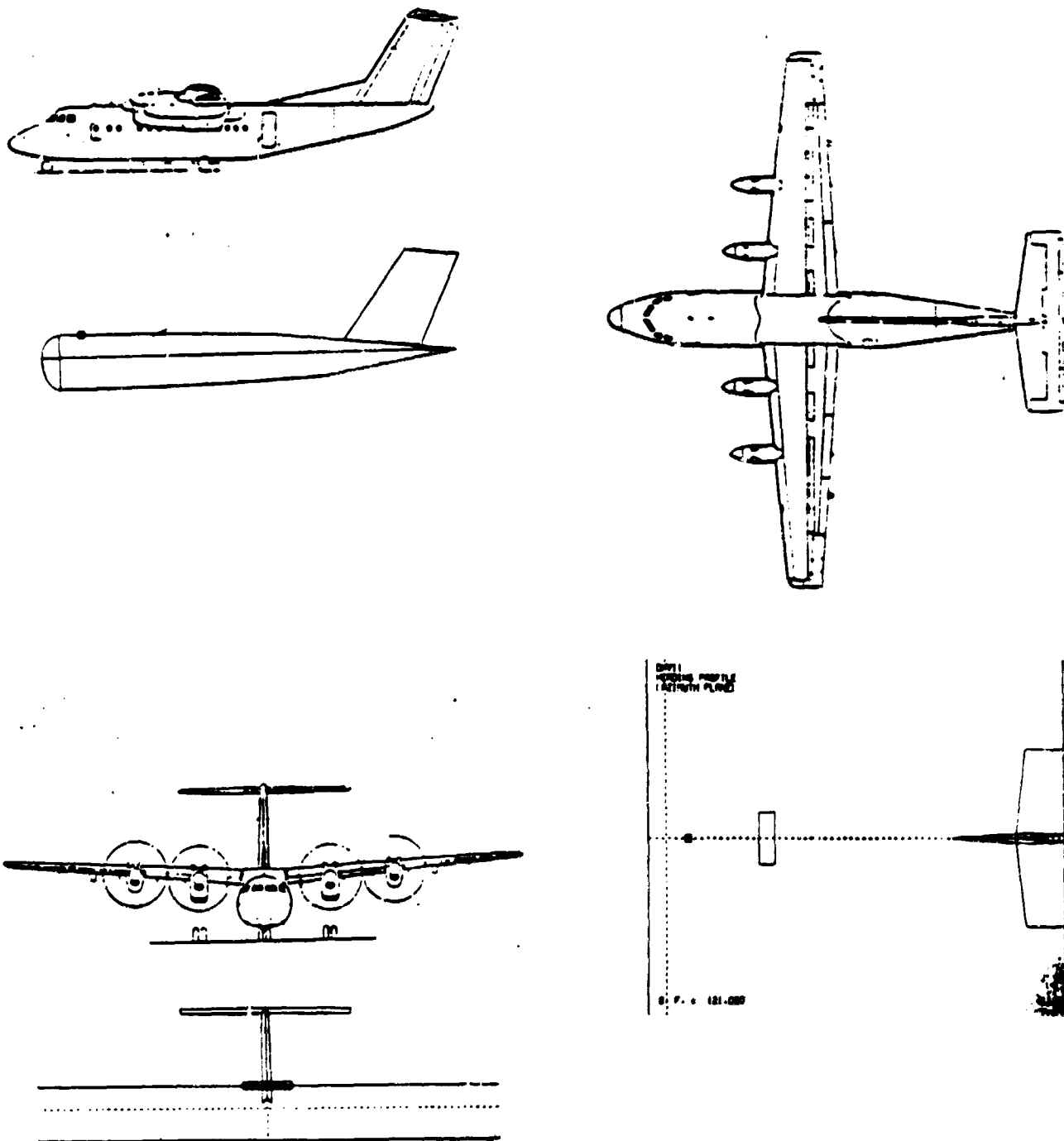


Figure II.3-2. deHavilland DHC-7. Top front 1/4 wave-length monopole antenna above cockpit at antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

E-PHI  
DB PLOT

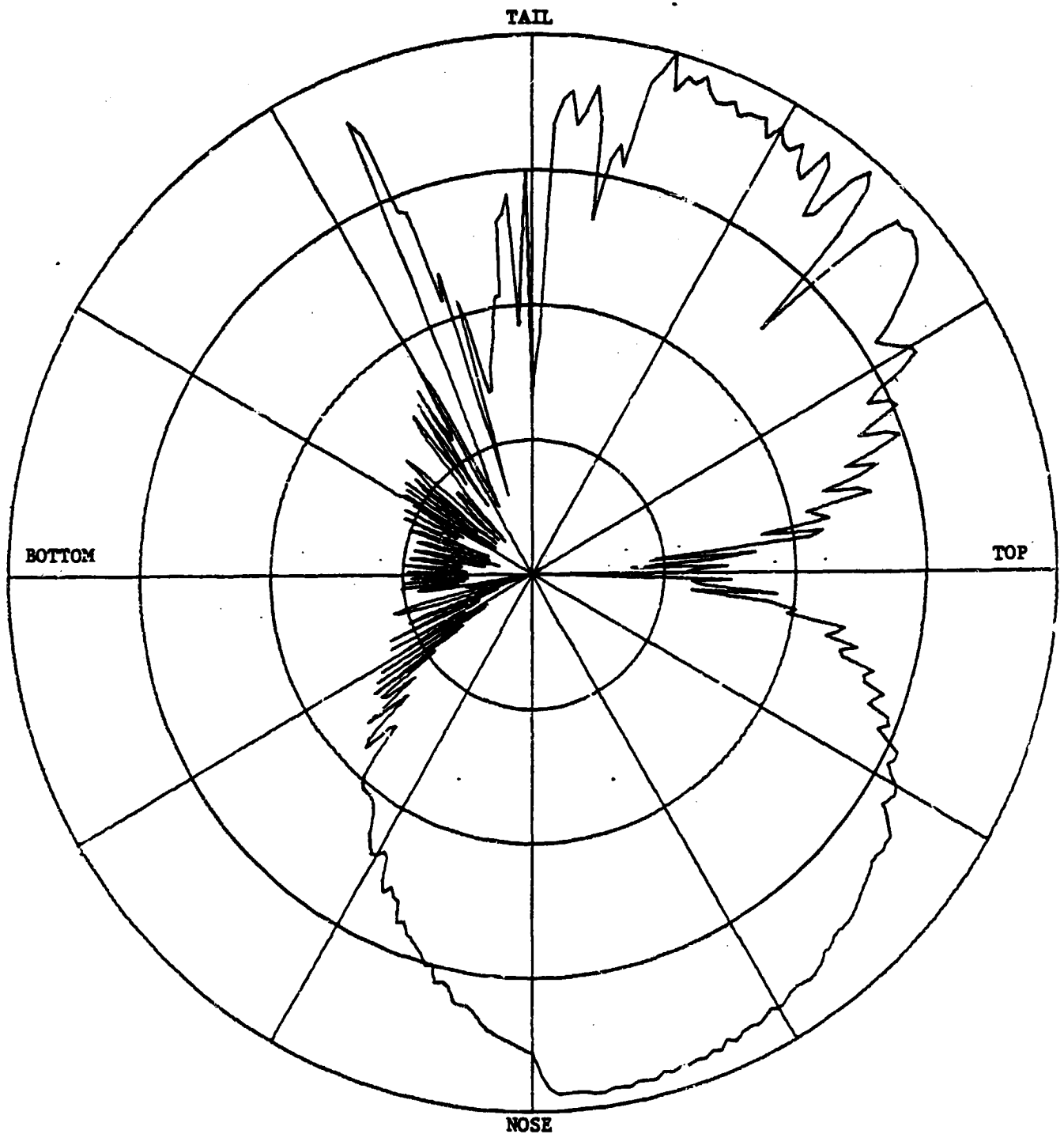


Figure II.3-3. deHavilland DHC-7. Elevation plane pattern  
for antenna location 1.

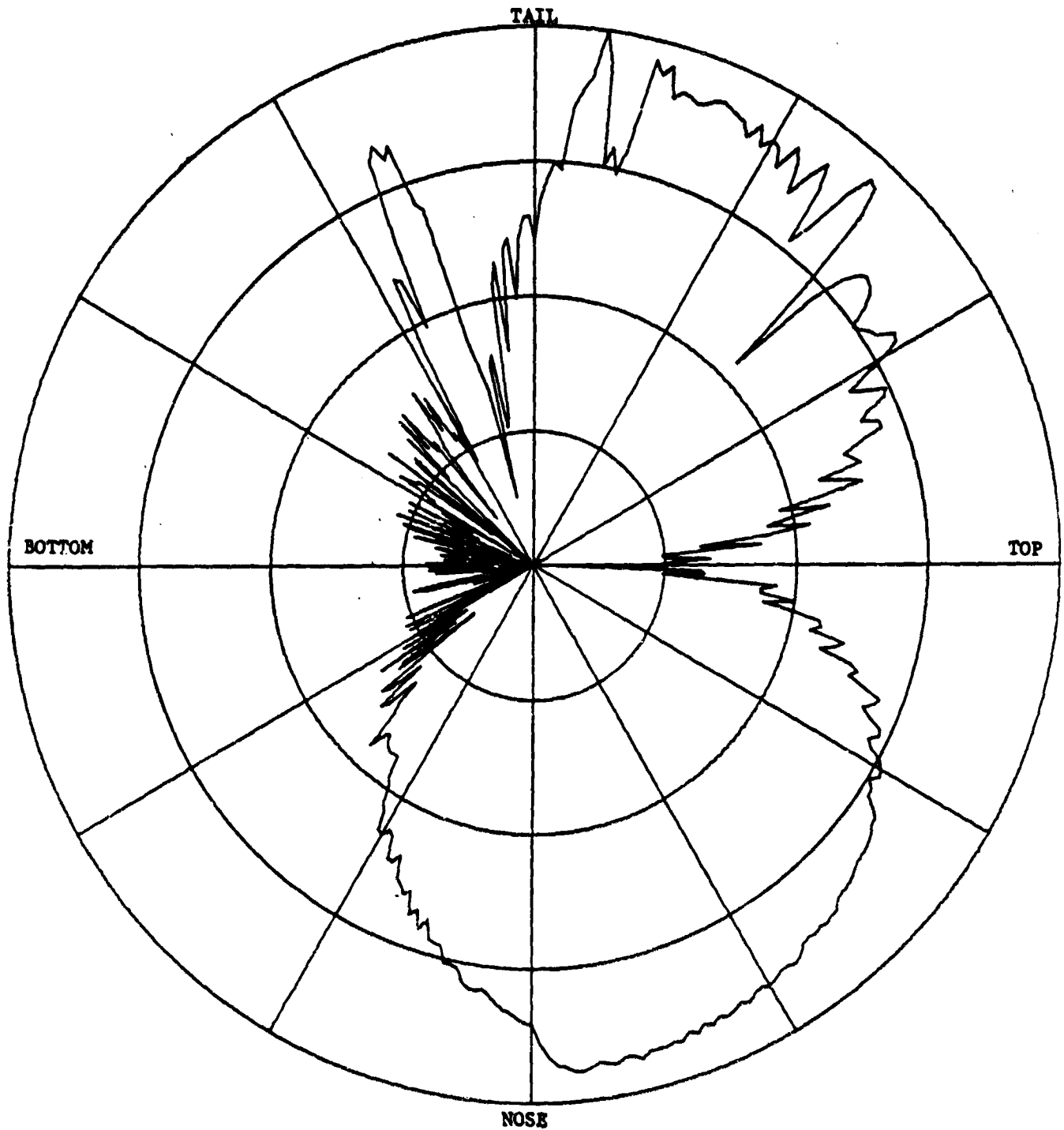


Figure II.3-4. deHavilland DHC-7. Off-elevation plane pattern,  $\text{THC}=10^\circ$ , for antenna location 1.



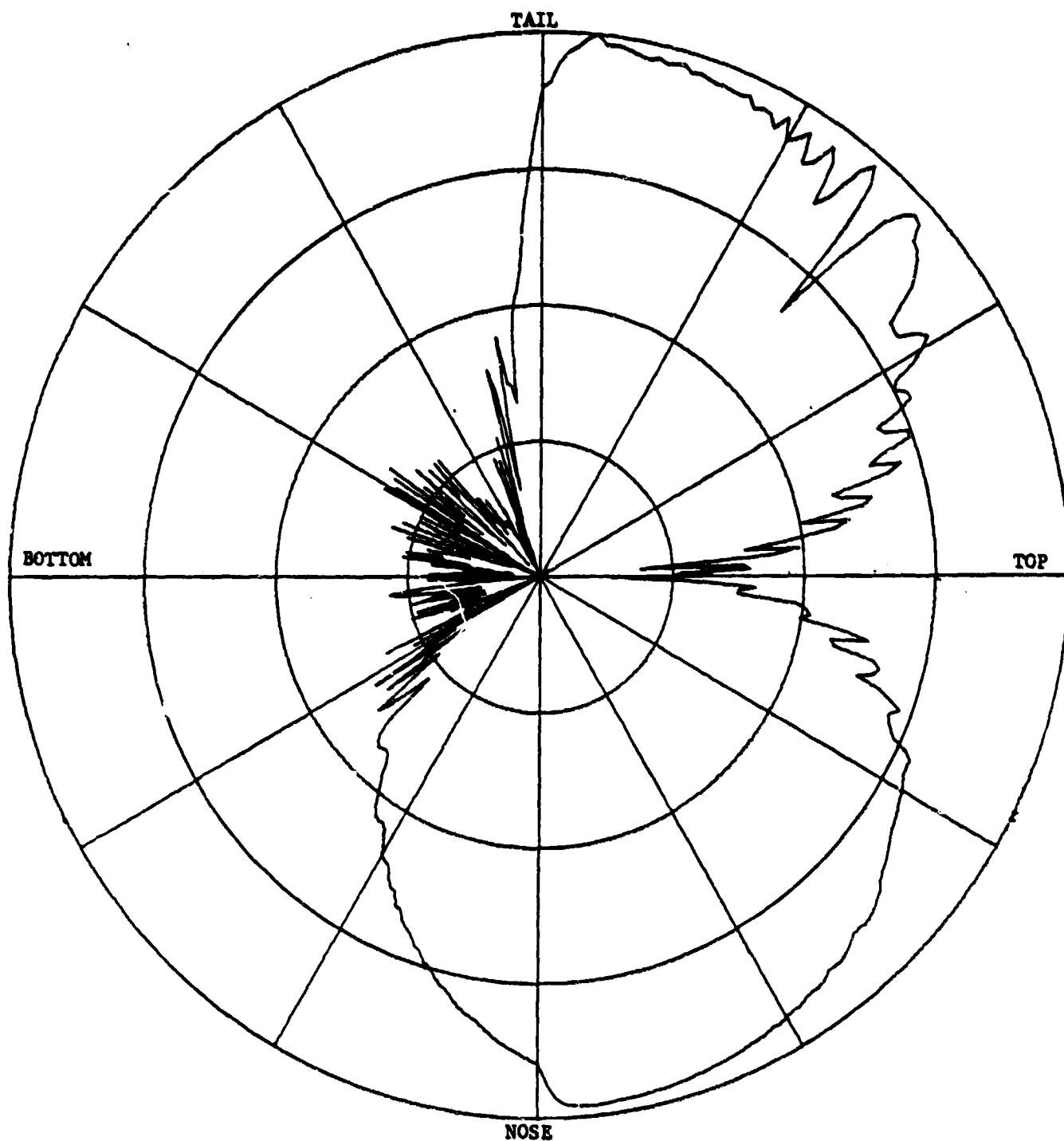


Figure II.3-5. deHavilland DHC-7. Off-elevation plane pattern,  
THC=20°, for antenna location 1.

E-PHI  
DB PLOT

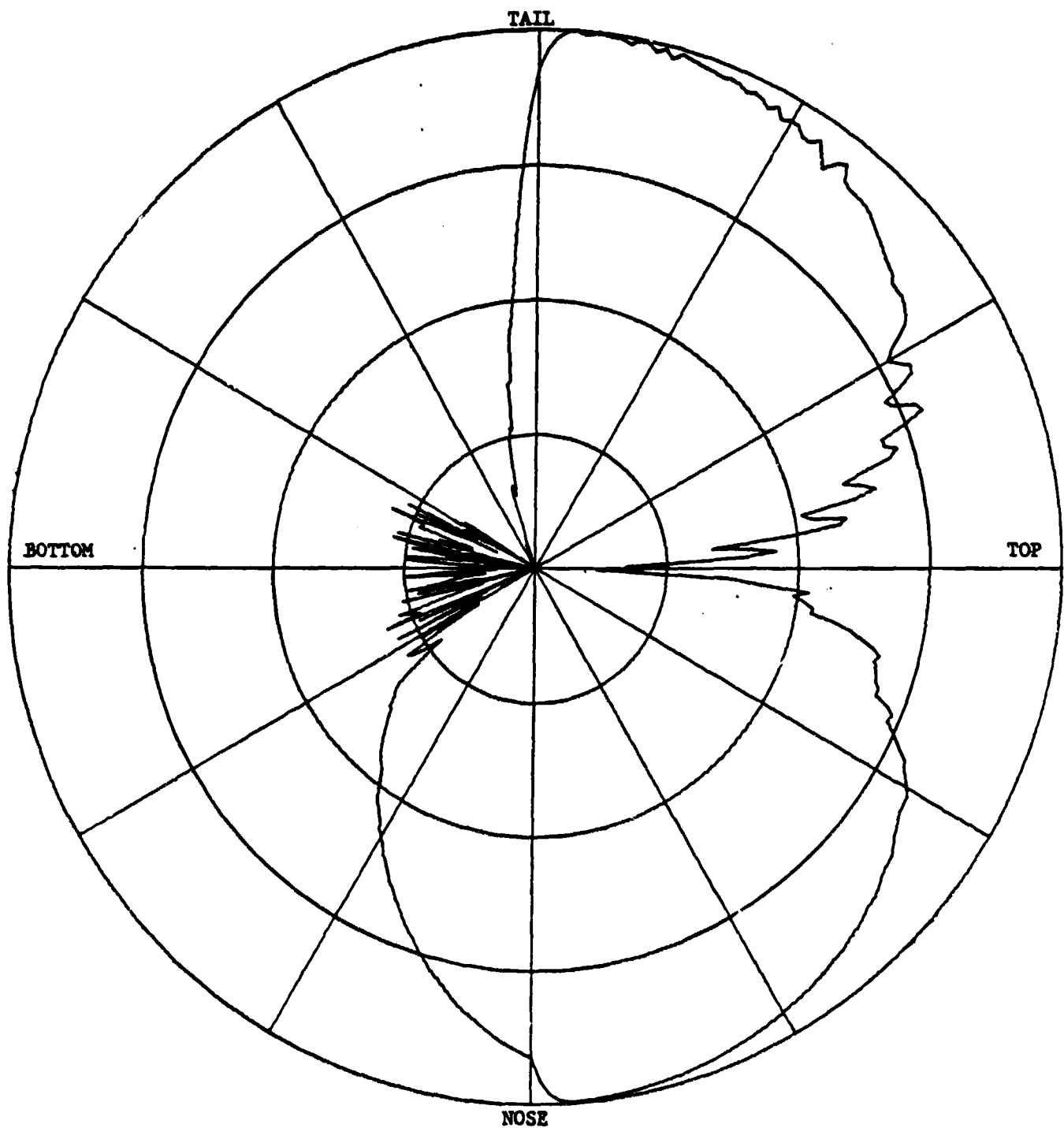


Figure II.3-6. deHavilland DHC-7. Off-elevation plane pattern,  
THC=30°, for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
45.86 37.76 65.38 847.92
0. 0. 0.
PG
4 T
39.93 -198.44 53.24
54.45 -232.32 53.24
54.45 -232.32 -53.24
39.93 -198.44 -53.24
PG
4 T
9.68 -773.35 10.31
194.81 -860.47 7.26
205.7 -745.52 0.
21.78 -607.58 0.
PG
4 T
21.78 -607.58 0.
205.7 -745.52 0.
194.81 -860.47 -7.26
9.68 -773.35 -10.31
SG
1
8.365886122122 0.
0. 0. 0. .25 3
1. 0.
PD
0. 0. 89.9
0 360 1
50000. 5.
PP
3.75 3
EX

```

Figure II.4-1. deHavilland DHC-7. Data set for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

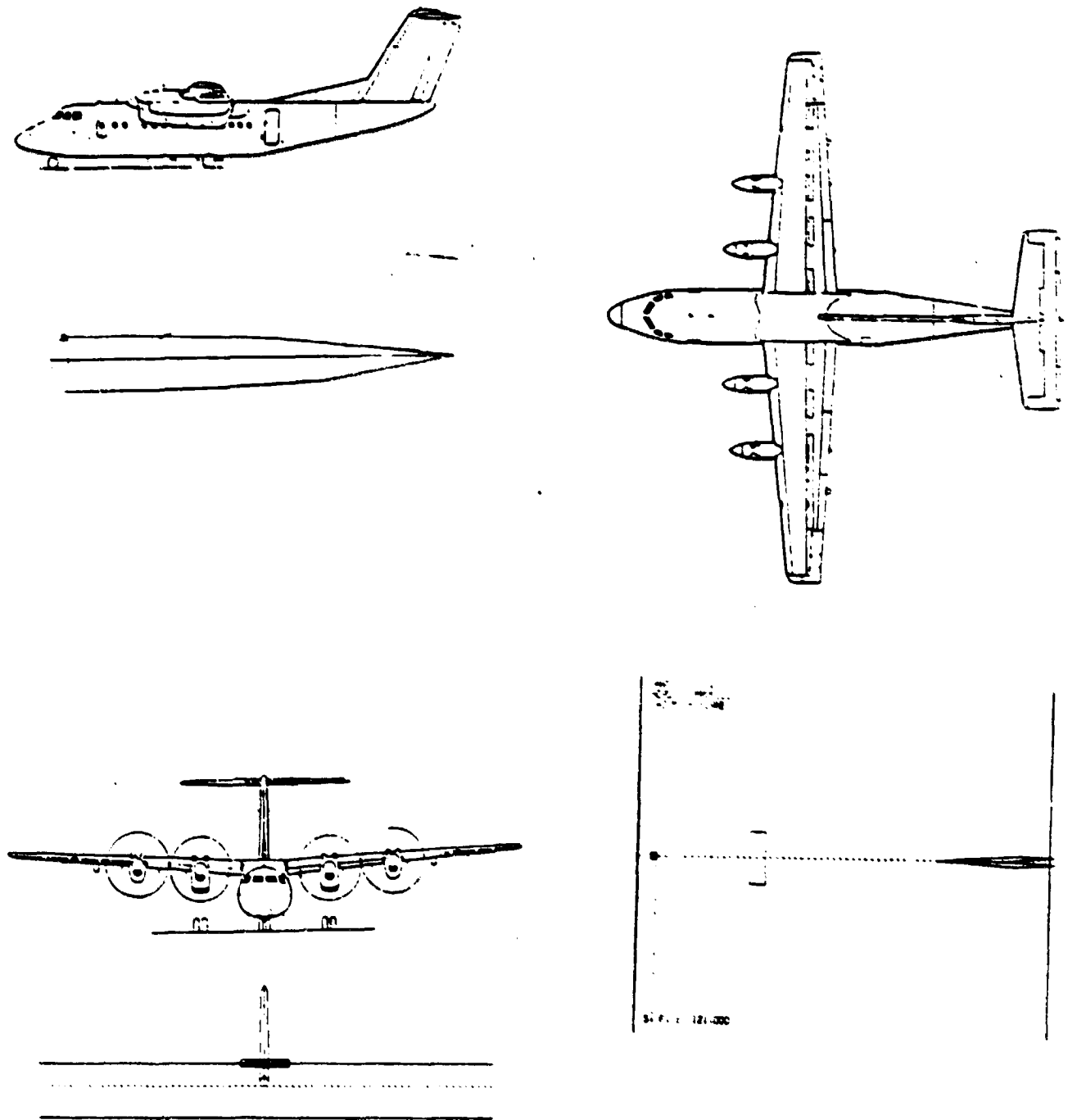


Figure II.4-2. deHavilland DHC-7. Top front  $1/4$  wavelength monopole antenna above cockpit at antenna location 2.

E-PHI  
DB PLOT

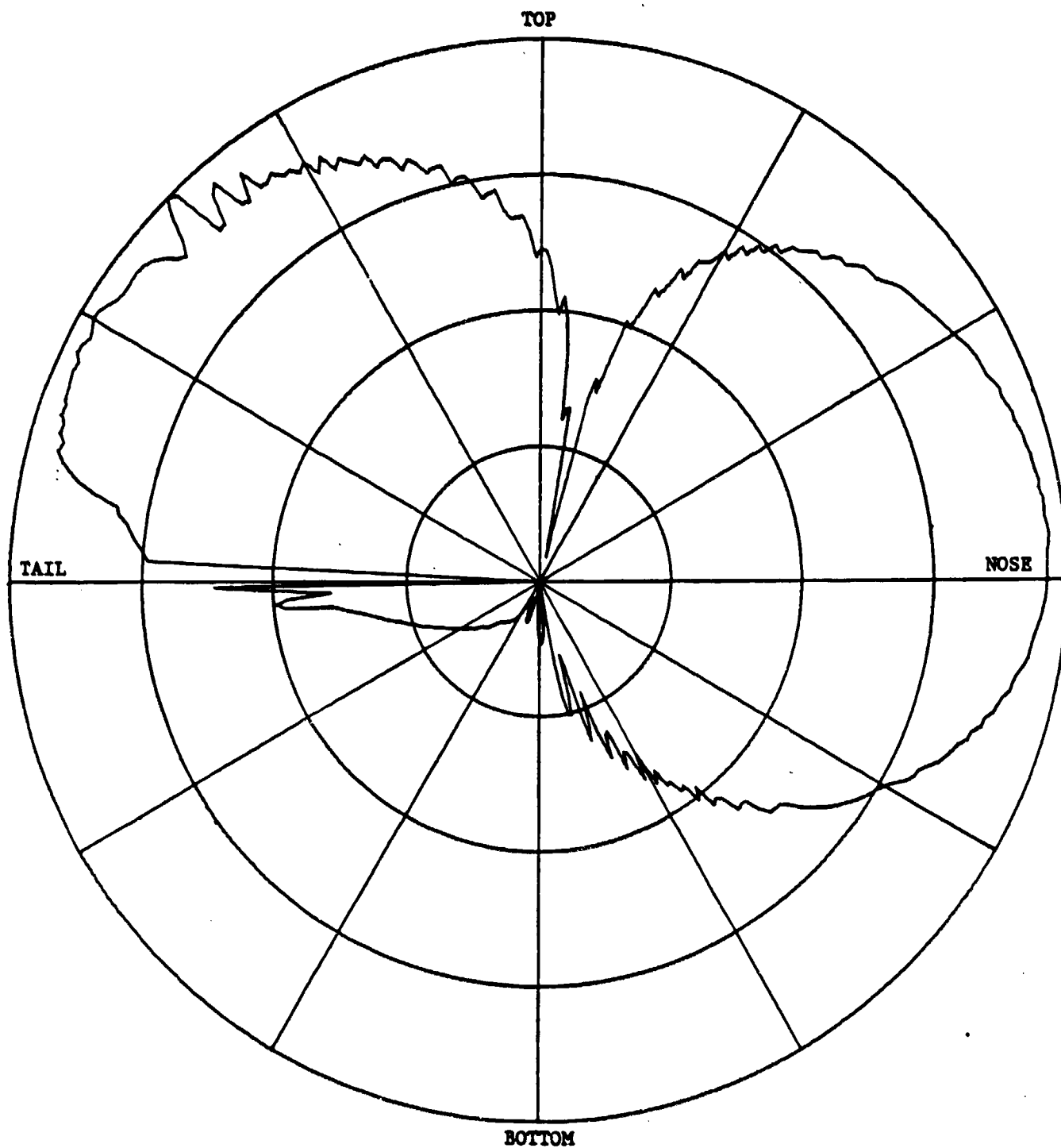


Figure II.4-3. deHavilland DHC-7. Elevation plane pattern for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
45.86 37.76 65.38 847.92
0. 0. 0.
PG
4 T
39.93 -198.44 53.24
54.45 -232.32 53.24
54.45 -232.32 -53.24
39.93 -198.44 -53.24
PG
4 T
27.83 29.04 -38.72
-3.63 117.37 -12.1
-3.63 117.37 12.1
27.83 29.04 38.72
PG
4 T
9.68 -773.35 10.31
194.81 -860.47 7.26
205.7 -745.52 0.
21.78 -607.58 0.
PG
4 T
21.78 -607.58 0.
205.7 -745.52 0.
194.81 -860.47 -7.26
9.68 -773.35 -10.31
SG
1
8.365886122122 0.
0. 0. 0. .25 3
1. 0.
PD
0. 0. 89.9
0 360 1
50000. 5.
PP
3.75 3
EX

```

Figure II.5-1. deHavilland DHC-7. Data set with cockpit  
plate for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

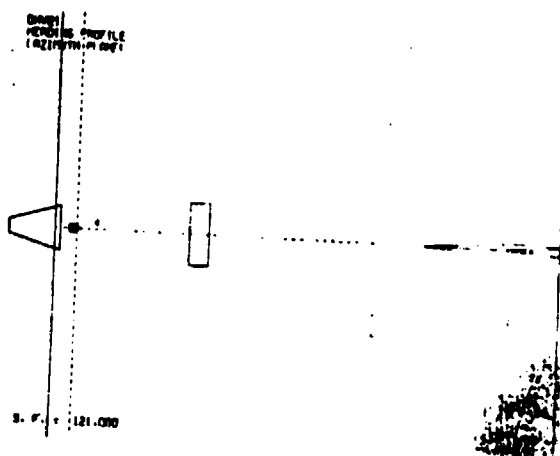
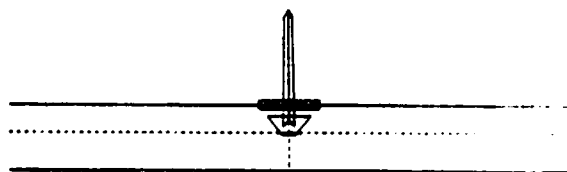
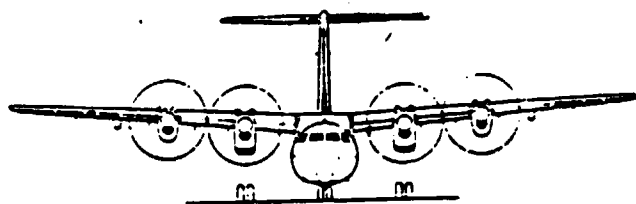
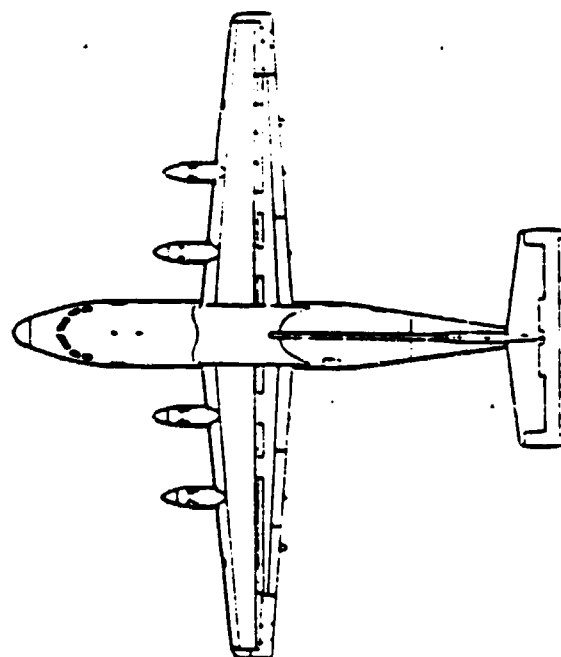
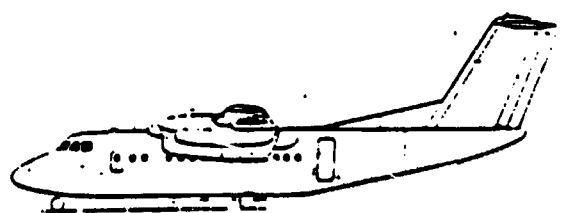


Figure II.5-2. deHavilland DHC-7. Top front 1/4 wavelength monopole antenna above cockpit at antenna location 2.

E-PHI  
DB PLOT

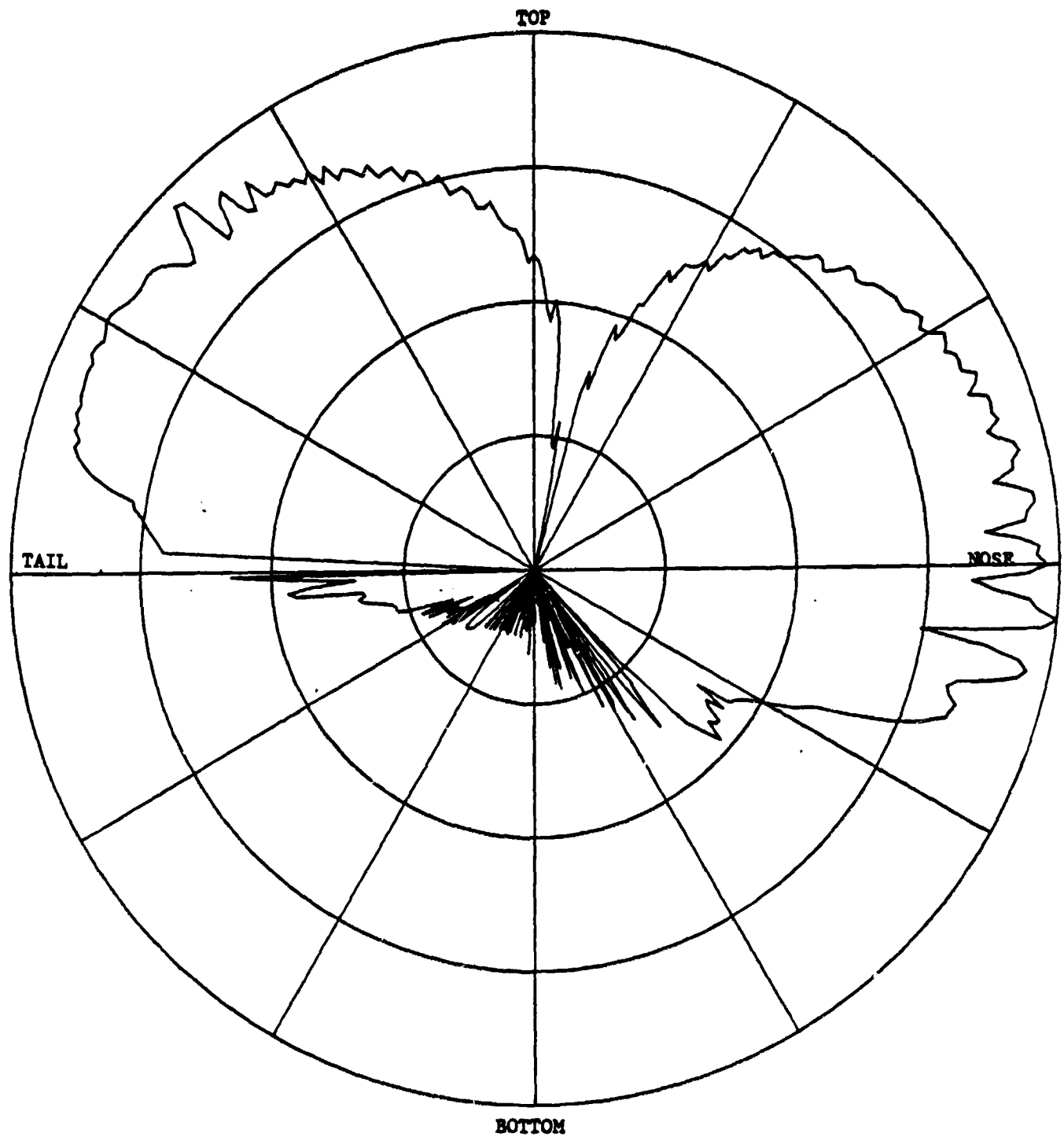


Figure II.5-3. deHavilland DHC-7. Elevation plane pattern for antenna location 2.



ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
49.86 37.76 69.38 847.92  
0. 0. 0.

PG  
4 T  
39.93 -198.44 53.24  
54.45 -232.32 53.24  
54.45 -232.32 -53.24  
39.93 -198.44 -53.24

PG  
4 F  
194.81 -860.47 7.26  
194.81 -860.47 181.5  
203.74 -766.2 181.5  
203.7 -745.52 0.

PG  
4 F  
203.7 -745.52 0.  
203.74 -766.2 -181.5  
194.81 -860.47 -181.5  
194.81 -860.47 -7.26

PG  
4 T  
9.68 -773.35 10.31  
194.81 -860.47 7.26  
203.7 -745.52 0.  
21.78 -607.58 0.

PG  
4 T  
21.78 -607.58 0.  
203.7 -745.52 0.  
194.81 -860.47 -7.26  
9.68 -773.35 -10.31

SG  
1  
8.365886122122 0.  
0. 0. 0. .25 3  
1. 0.

PD  
0. 270. 89.9  
0 360 1  
50000. 5.

PP  
3.75 3

EX

Figure II.6-1. deHavilland DHC-7. Data set with T-tail  
for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

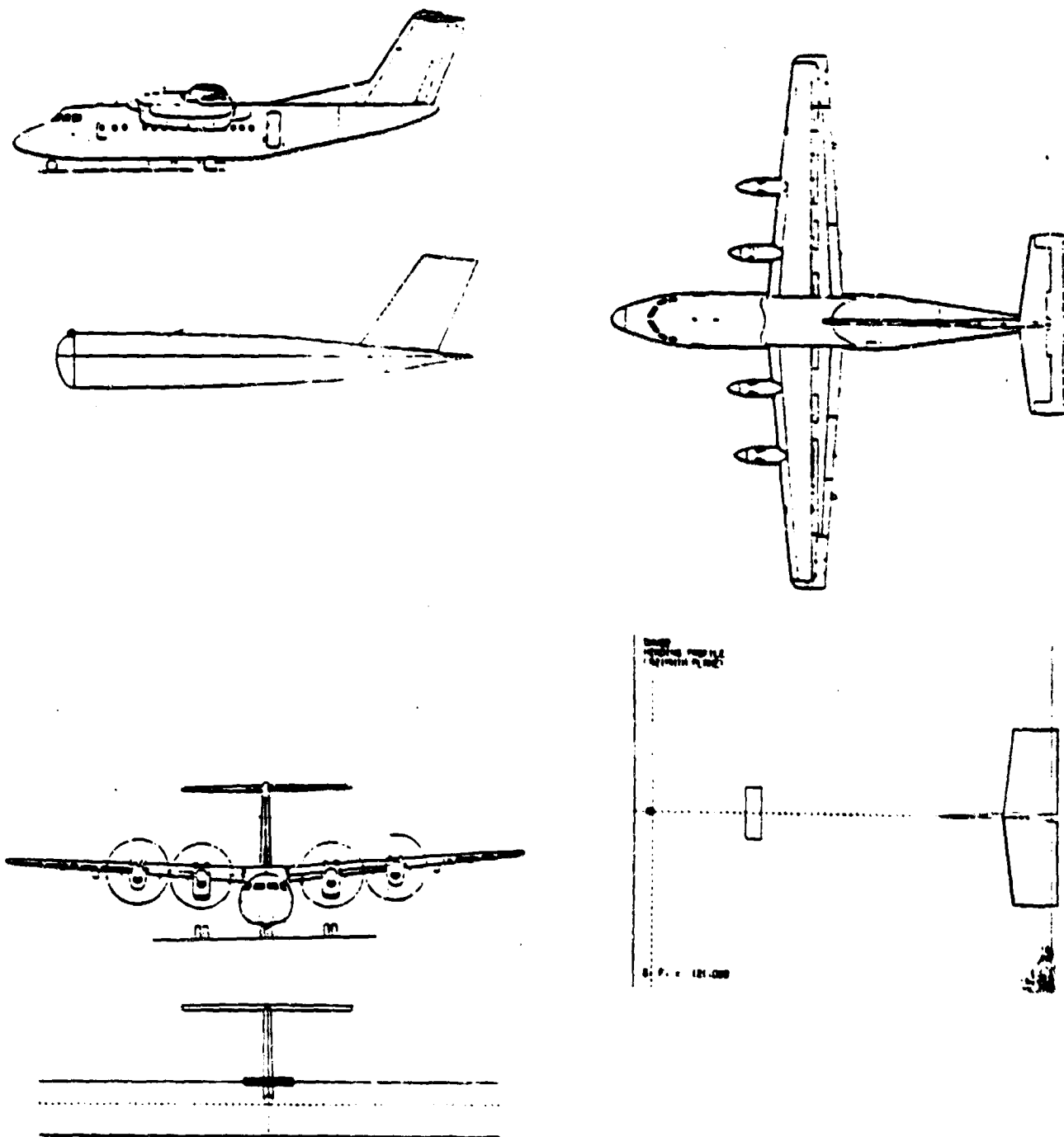


Figure II.6-2. deHavilland DHC-7. Top front 1/4 wavelength monopole antenna above cockpit at antenna location 2.

E-PHI  
DB PLOT

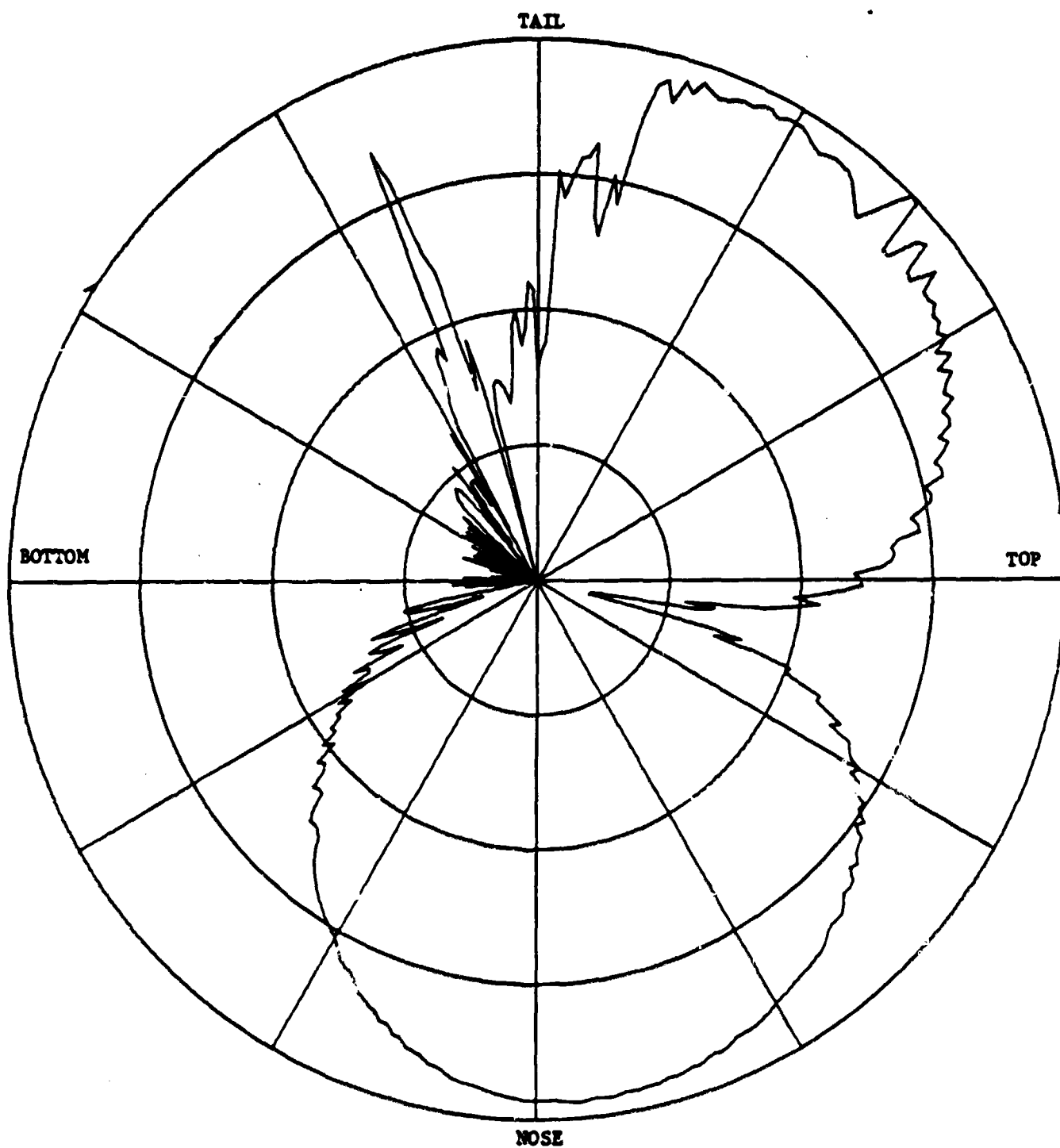


Figure II.6-3. deHavilland DHC-7. Elevation plane pattern for antenna location 2.

E-PHI  
DB FLOT

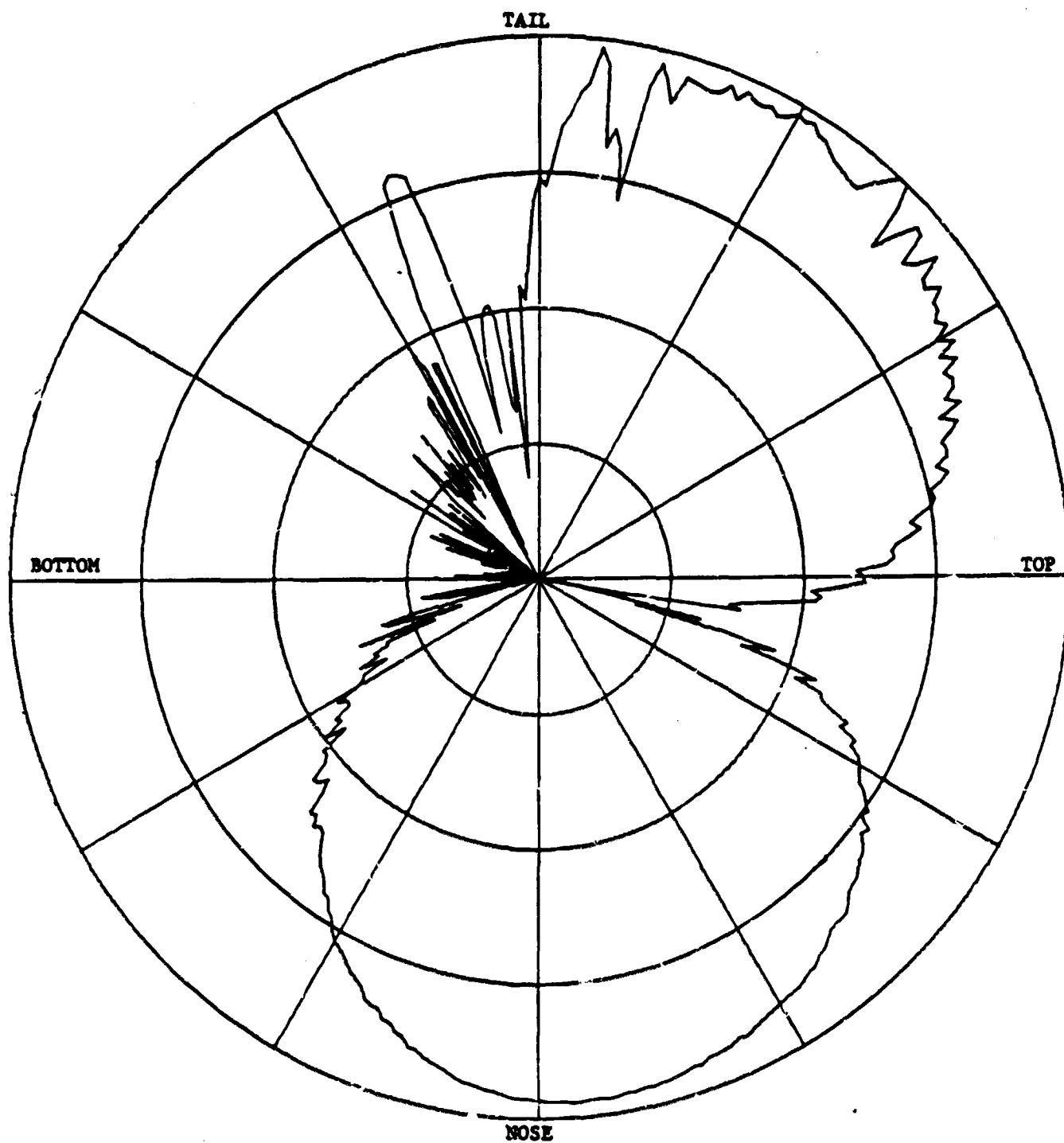


Figure II.6-4. deHavilland DHC-7. Off-elevation plane pattern.  
THC=10°, for antenna location 2.

E-PHI  
DB PLOT

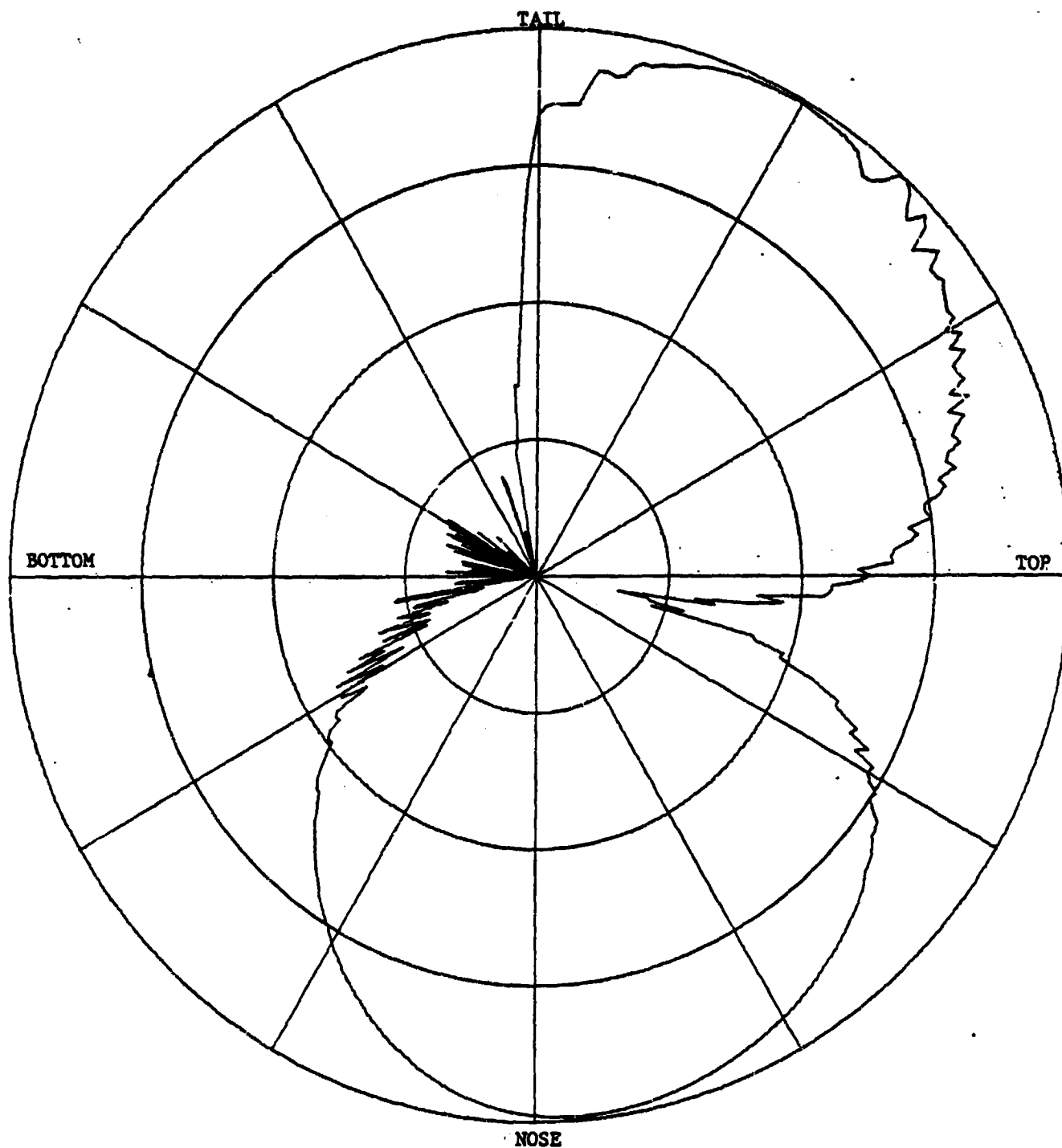


Figure II.6-5. deHavilland DHC-7. Off-elevation plane pattern,  $THC=20^\circ$ , for antenna location 2.

E-PHI  
DB PLOT

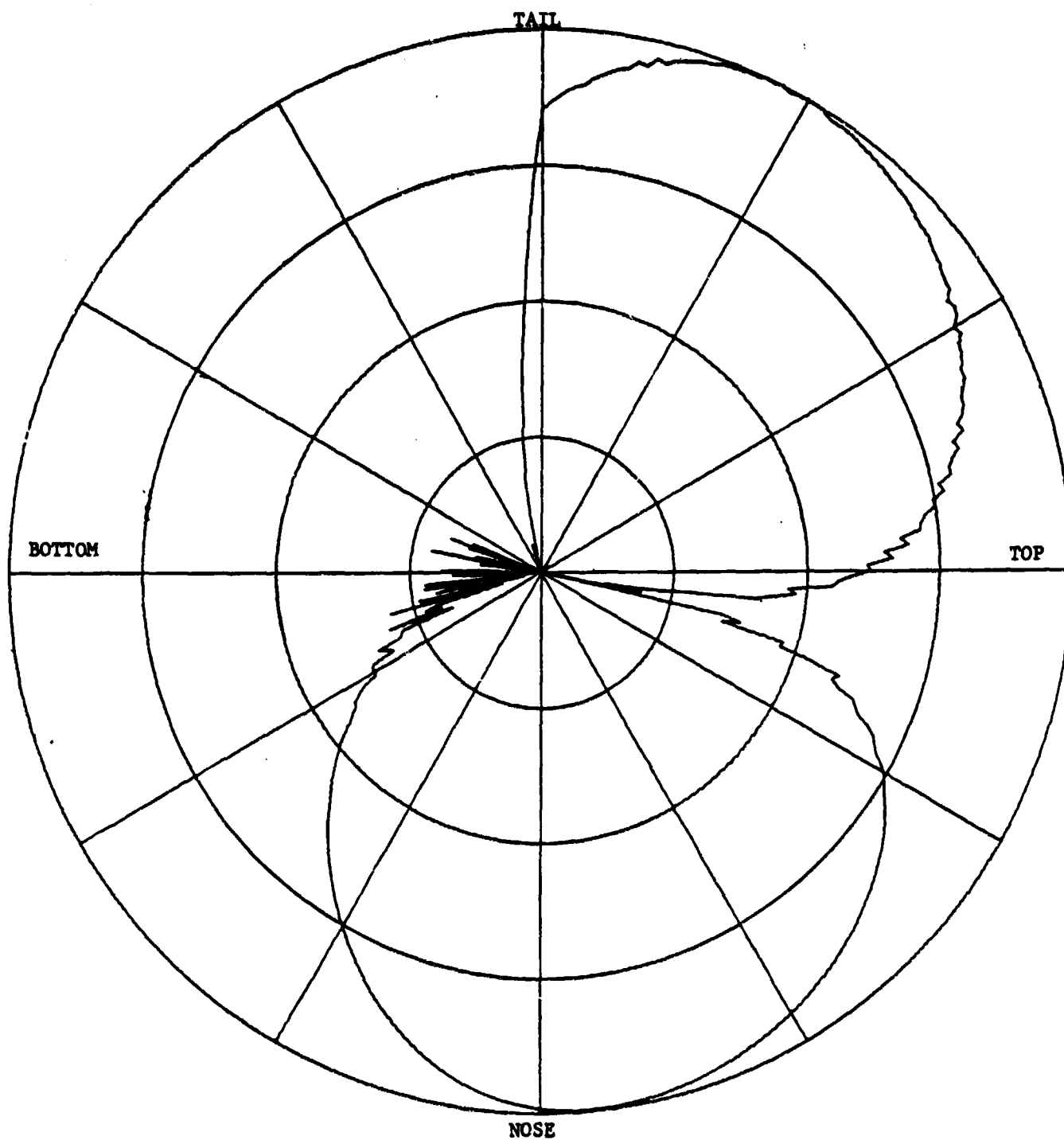


Figure II.6-6. deHavilland DHC-7. Off-elevation plane pattern,  $\text{THC}=30^\circ$ , for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
45.86 37.76 65.39 847.92  
0. 0. 0.

PG  
4 T  
39.93 -198.44 53.24  
54.45 -232.32 53.24  
54.45 -232.32 -53.24  
39.93 -198.44 -53.24

PG  
4 T  
27.83 29.04 -38.72  
-3.63 117.37 -12.1  
-3.63 117.37 12.1  
27.83 29.04 38.72

PG  
4 F  
194.81 -860.47 7.26  
194.81 -860.47 181.5  
203.74 -766.2 181.5  
205.7 -745.52 0.

PG  
4 F  
205.7 -745.52 0.  
203.74 -766.2 -181.5  
194.81 -860.47 -181.5  
194.81 -860.47 -7.26

PG  
4 T  
9.68 -773.35 10.31  
194.81 -860.47 7.26  
205.7 -745.52 0.  
21.78 -607.58 0.

PG  
4 T  
21.78 -607.58 0.  
205.7 -745.52 0.  
194.81 -860.47 -7.26  
9.68 -773.35 -10.31

SG  
1  
8.365886122122 0.  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 270. 89.9  
0 360 1  
50000. 5.  
PP  
3.75 3  
EX

Figure II.7-1. deHavilland DHC-7. Data set with cockpit plate  
and T-tail for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

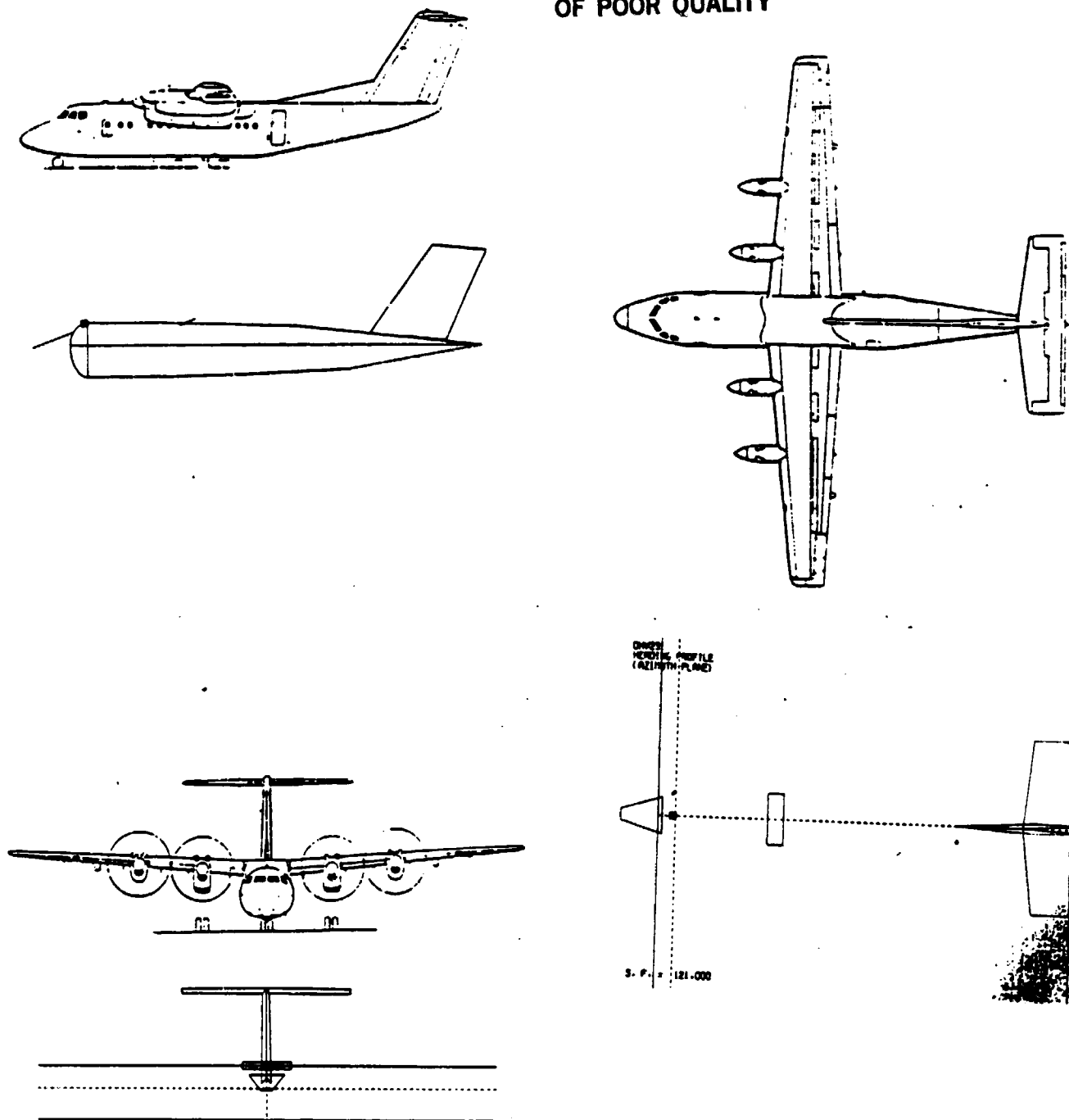


Figure II.7-2. deHavilland DH-7. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.



E-PHI  
DB PLOT

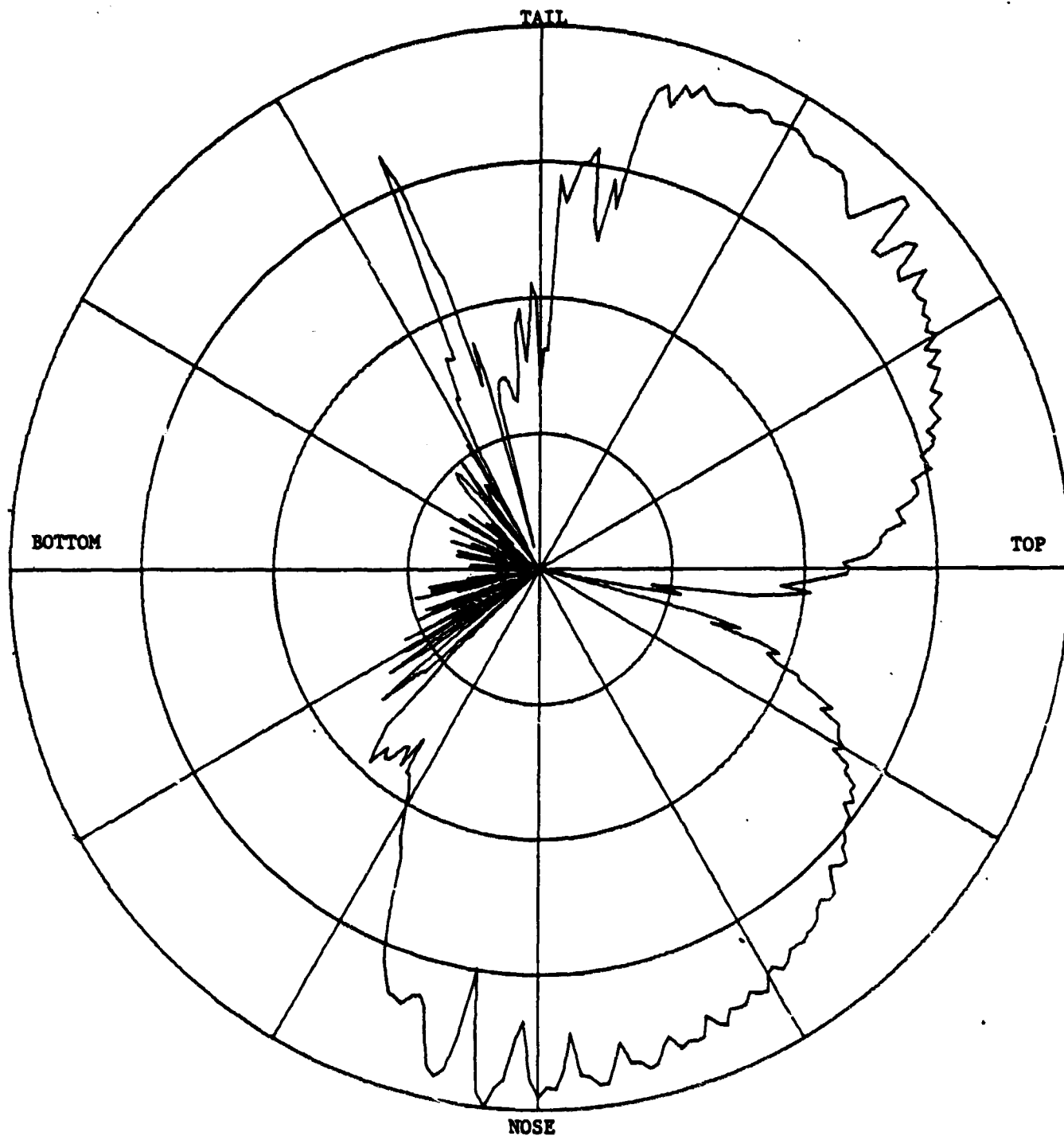


Figure II.7-3. deHavilland DHC-7. Elevation plane pattern for antenna location 2.

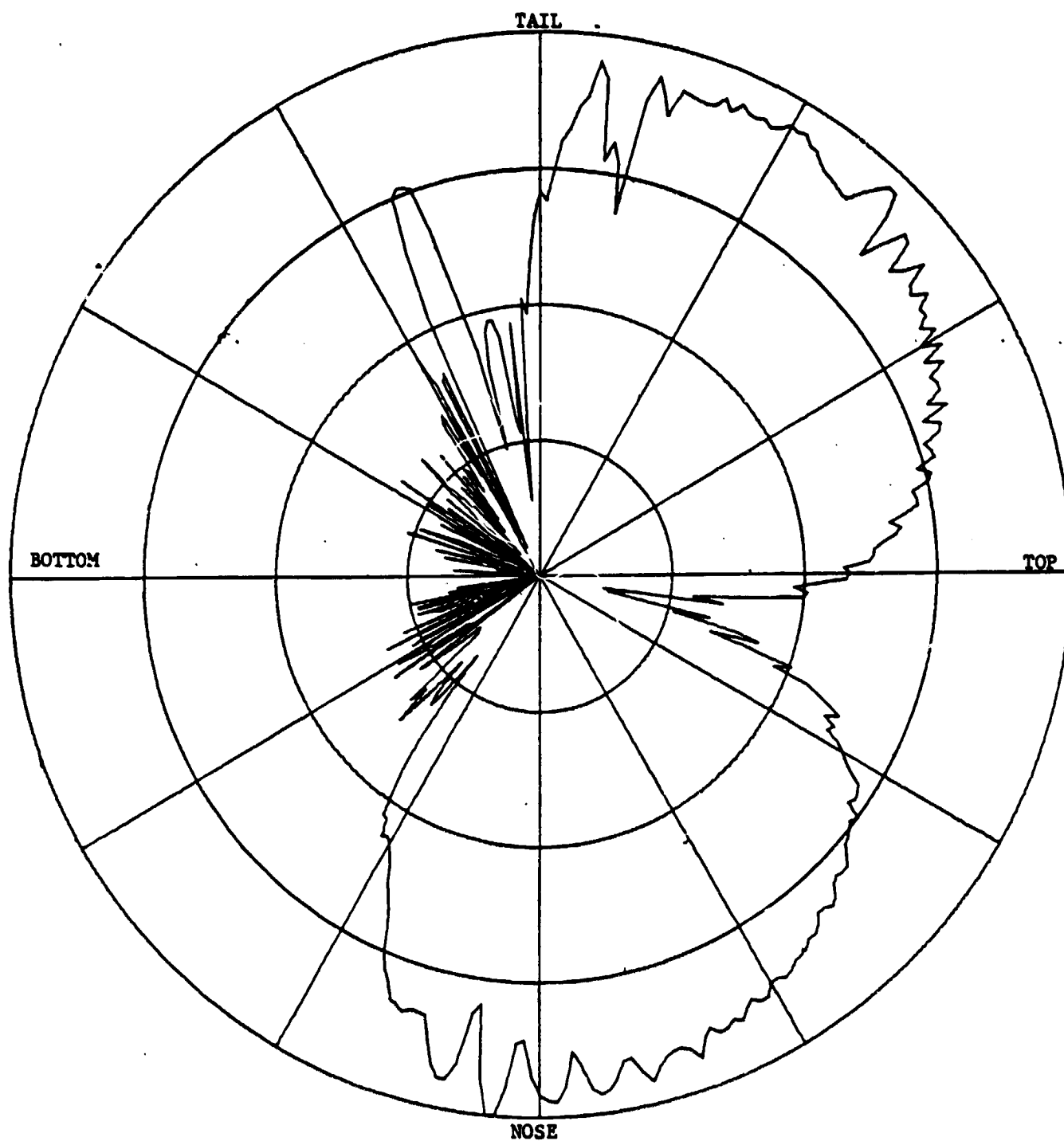


Figure II.7-4. deHavilland DHC-7. Off-elevation plane pattern,  $\text{THC}=10^\circ$ , for antenna location 2.

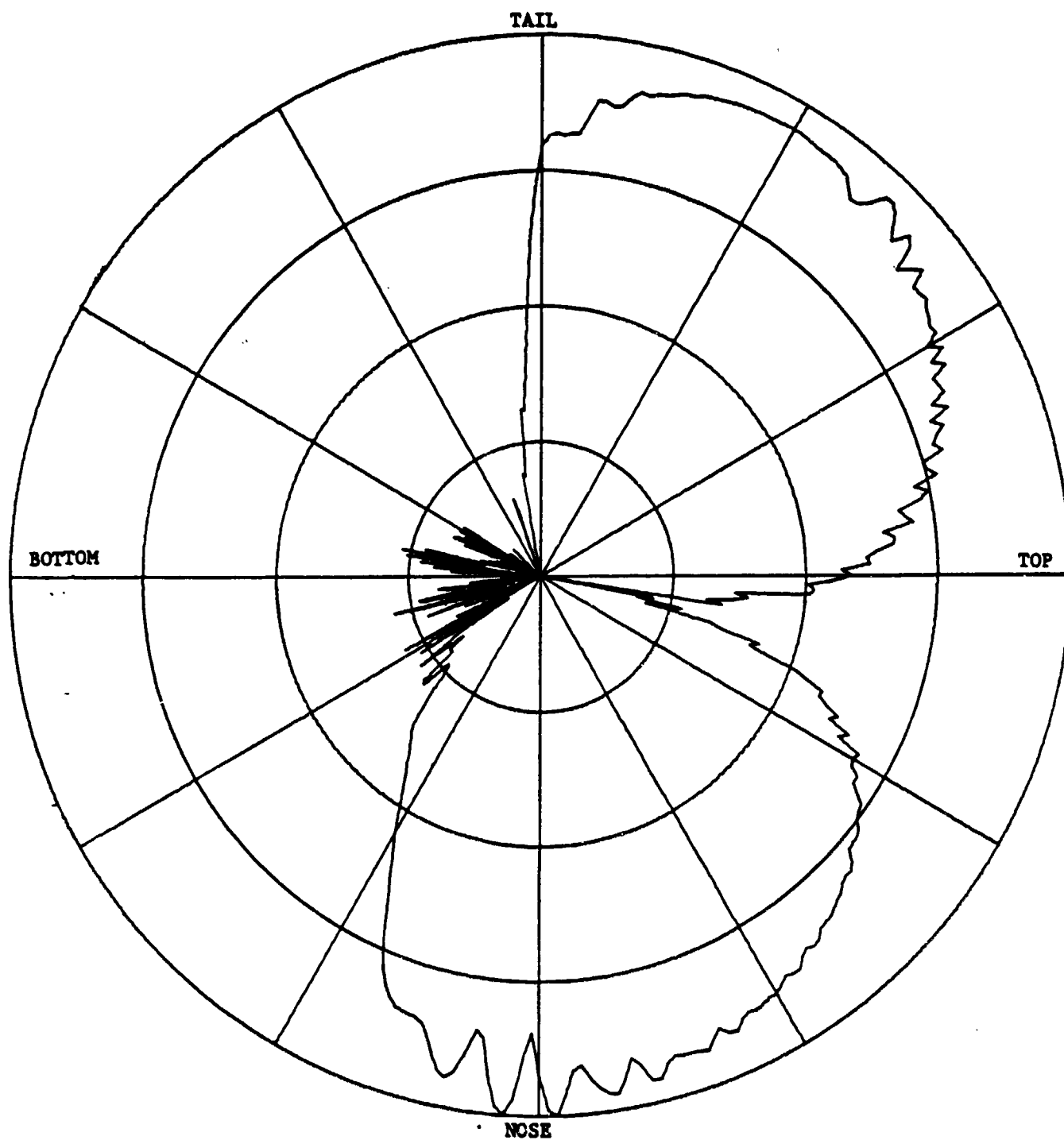


Figure II.7-5. deHavilland DHC-7. Off-elevation plane pattern,  $\text{THC}=20^\circ$ , for antenna location 2.

E-PHI  
DB PLOT

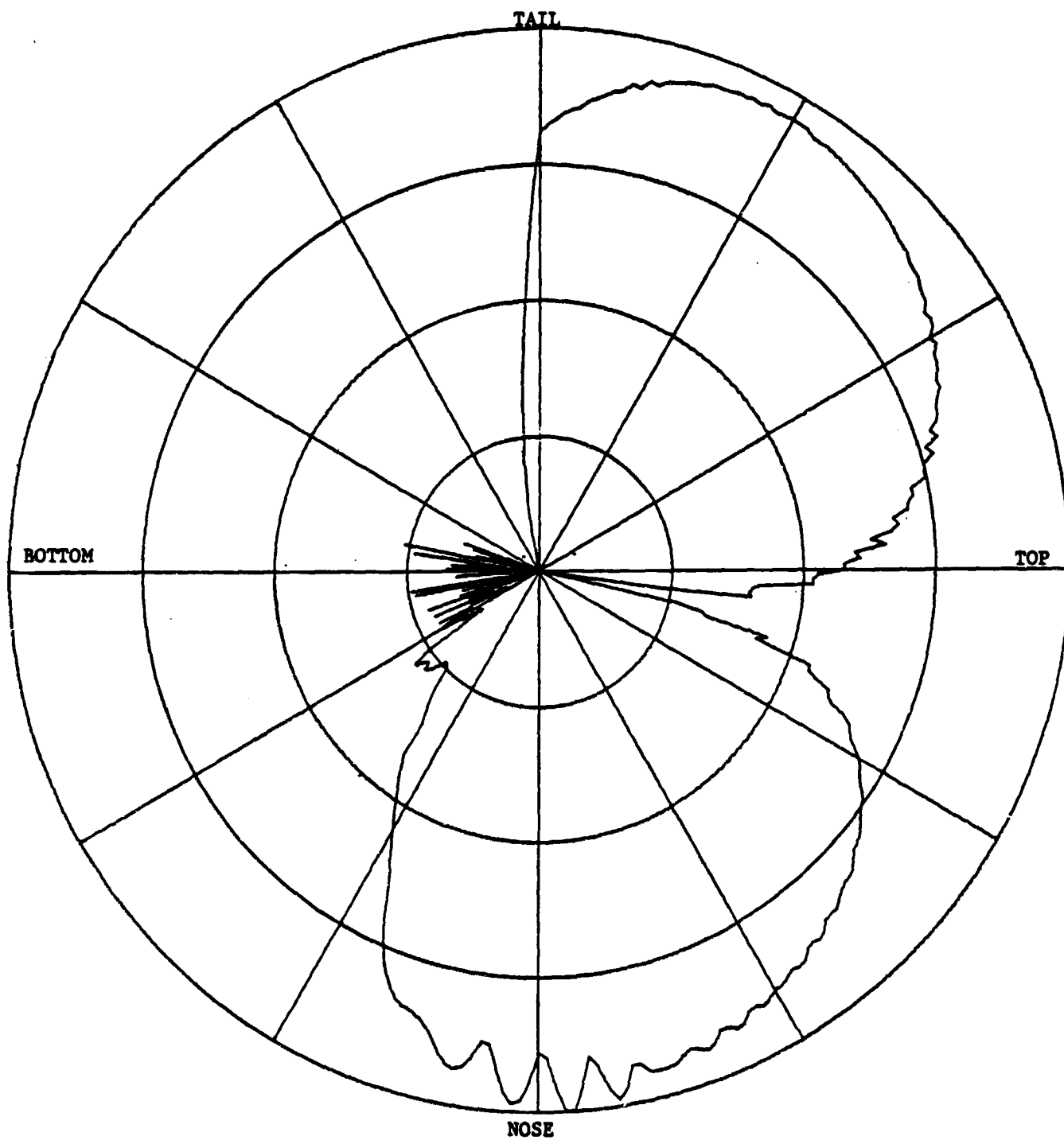


Figure II.7-6. deHavilland DHC-7. Off-elevation plane pattern,  
YHC=30°, for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
39.49933277987 59.84261140655 55.31254265132 547.7959579251  
0. 0. 0.  
PG  
4 T  
30.67 35.09 -54.45  
-39.93 394.46 -13.31  
-39.93 394.46 13.31  
30.67 35.09 54.45  
SG  
1  
-80.58737054473 0.  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 89.9  
0 360 1  
50000. 5.  
PP  
3.75 3  
EX

Figure II.8-1. deHavilland DEC-7. Data set for antenna location 4.

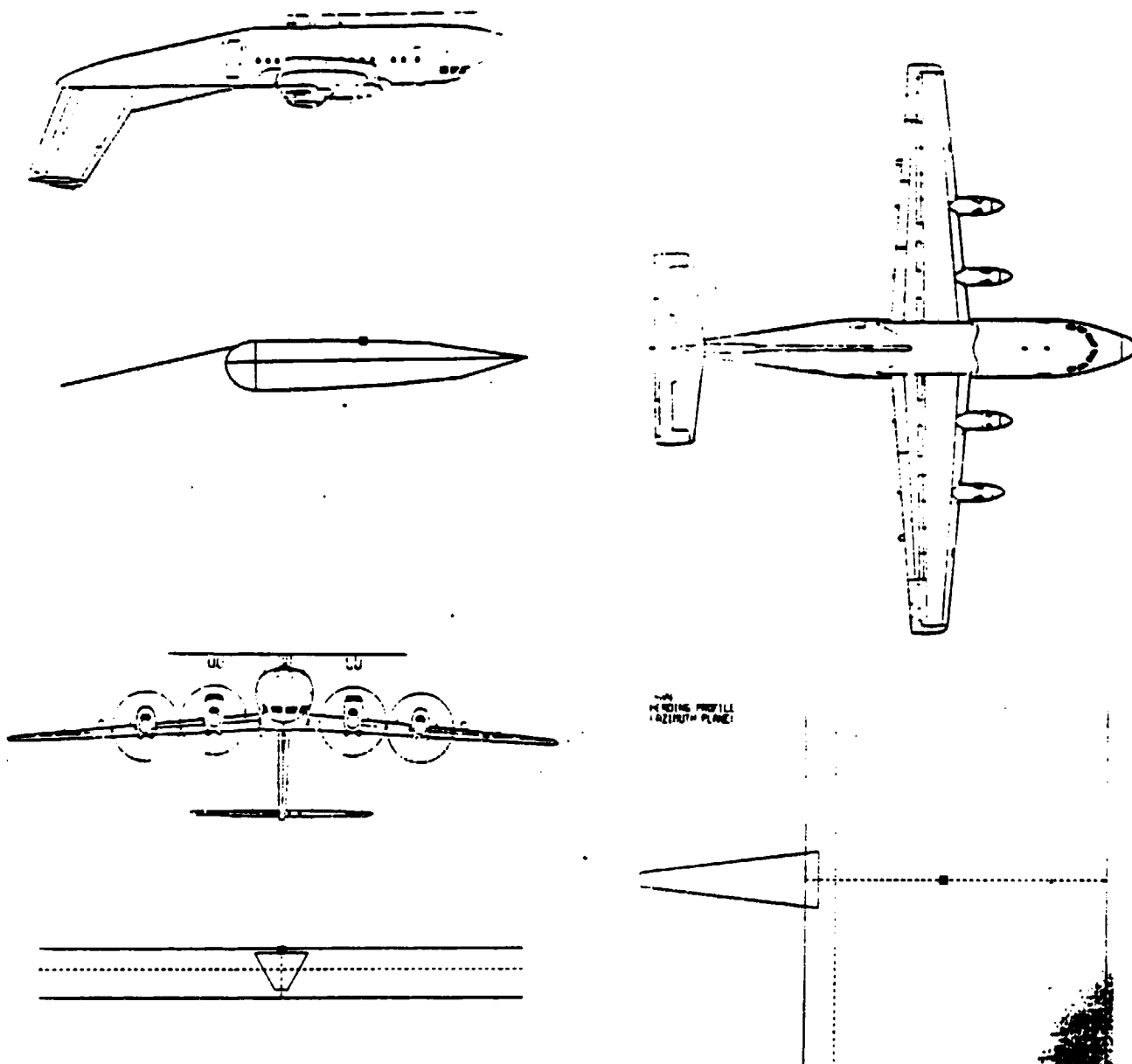


Figure II.8-2. deHavilland DHC-7. Bottom  $1/4$  wavelength monopole antenna for antenna location 4.

E-PHI  
DB PLOT

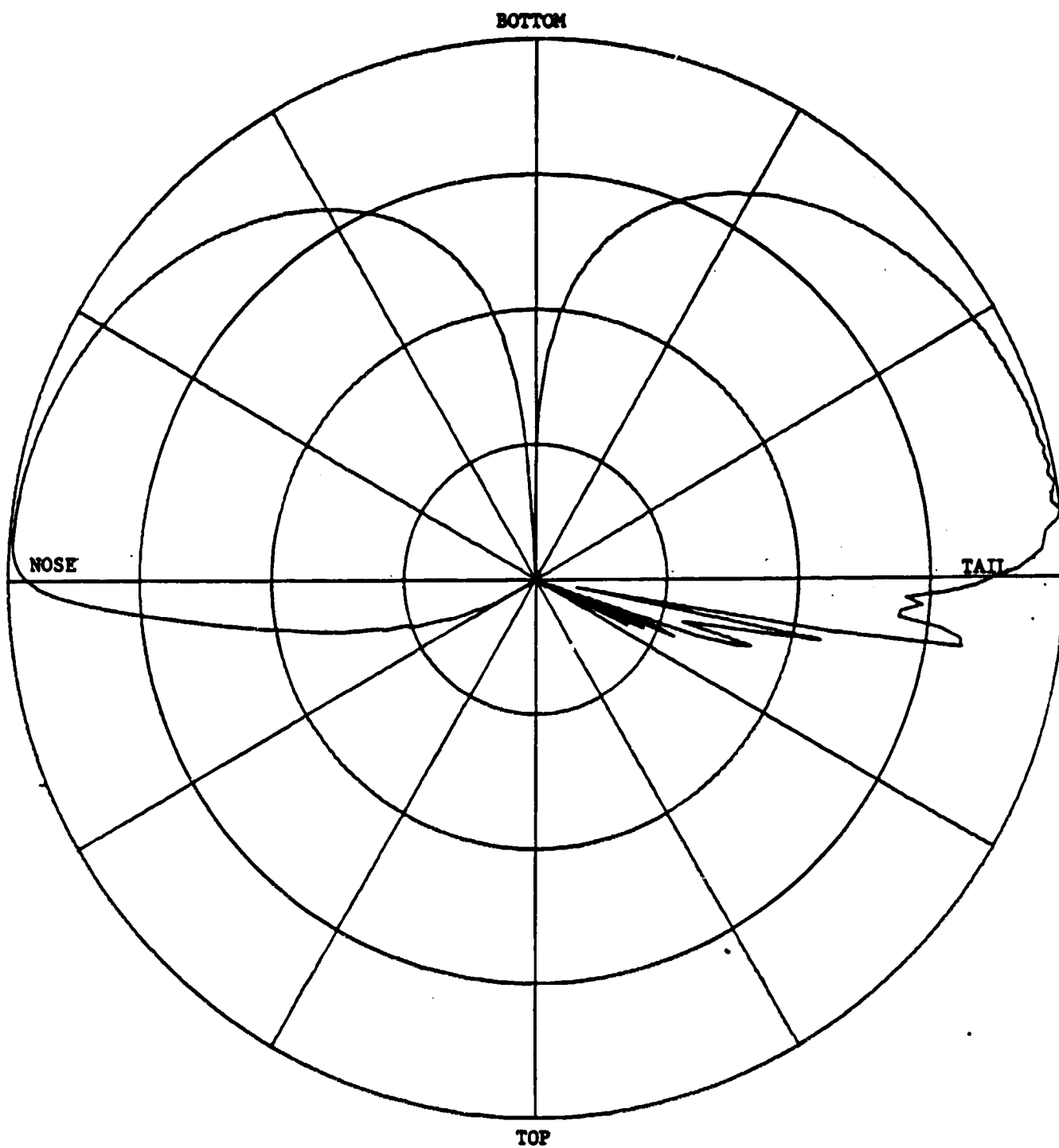


Figure II.8-3. deHavilland DHC-7. Elevation plane pattern for antenna location 4.

FG  
39.49933277987 59.84261140655 55.31254265132 547.7959579251  
0. 0. 0.

PG  
4 T  
30.67 35.09 -54.45  
-39.93 394.46 -13.31  
-39.93 394.46 13.31  
30.67 35.09 54.45

PG  
4 T  
15.0 -440.35 -2.42  
36.3 -440.35 -2.42  
36.3 -440.35 2.42  
15.0 -440.35 2.42

PG  
6 F  
36.3 -440.35 -2.42  
36.3 -440.35 -11.0  
59.29 -440.35 -11.0  
59.29 -440.35 11.0  
36.3 -440.35 11.0  
36.3 -440.35 2.42

PG  
4 T  
30.25 -390.0 13.5  
43.56 -393. 13.5  
38.72 -423. 13.5  
25.41 -420. 13.5

PG  
4 T  
25.41 -420. -13.5  
38.72 -423. -13.5  
43.56 -393. -13.5  
30.25 -390.0 -13.5

SG  
1  
-80.58737054473 0.  
0. 0. 0. .25 3  
1. 0.

PD  
0. 0. 89.9  
0 360 1  
90000. 5.

PP  
3.75 3

EX

Figure II.9-1. deHavilland DHC-7. Data set with landing gear  
for antenna location 4.



ORIGINAL PAGE IS  
OF POOR QUALITY

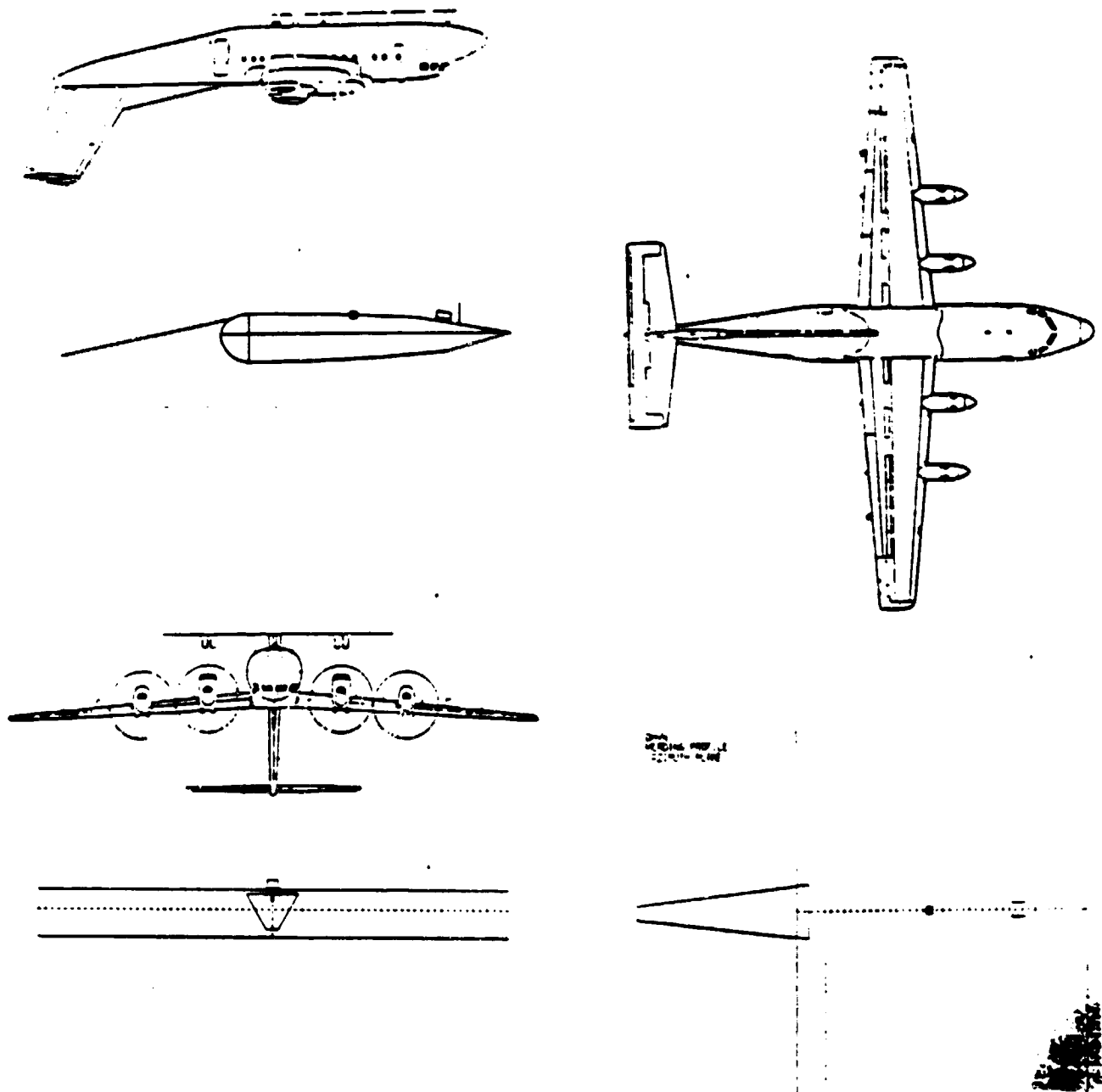


Figure II.9-2. deHavilland DHC-7. Bottom  $1/4$  wavelength monopole antenna for antenna location 4.

E-PHI  
DB PLOT

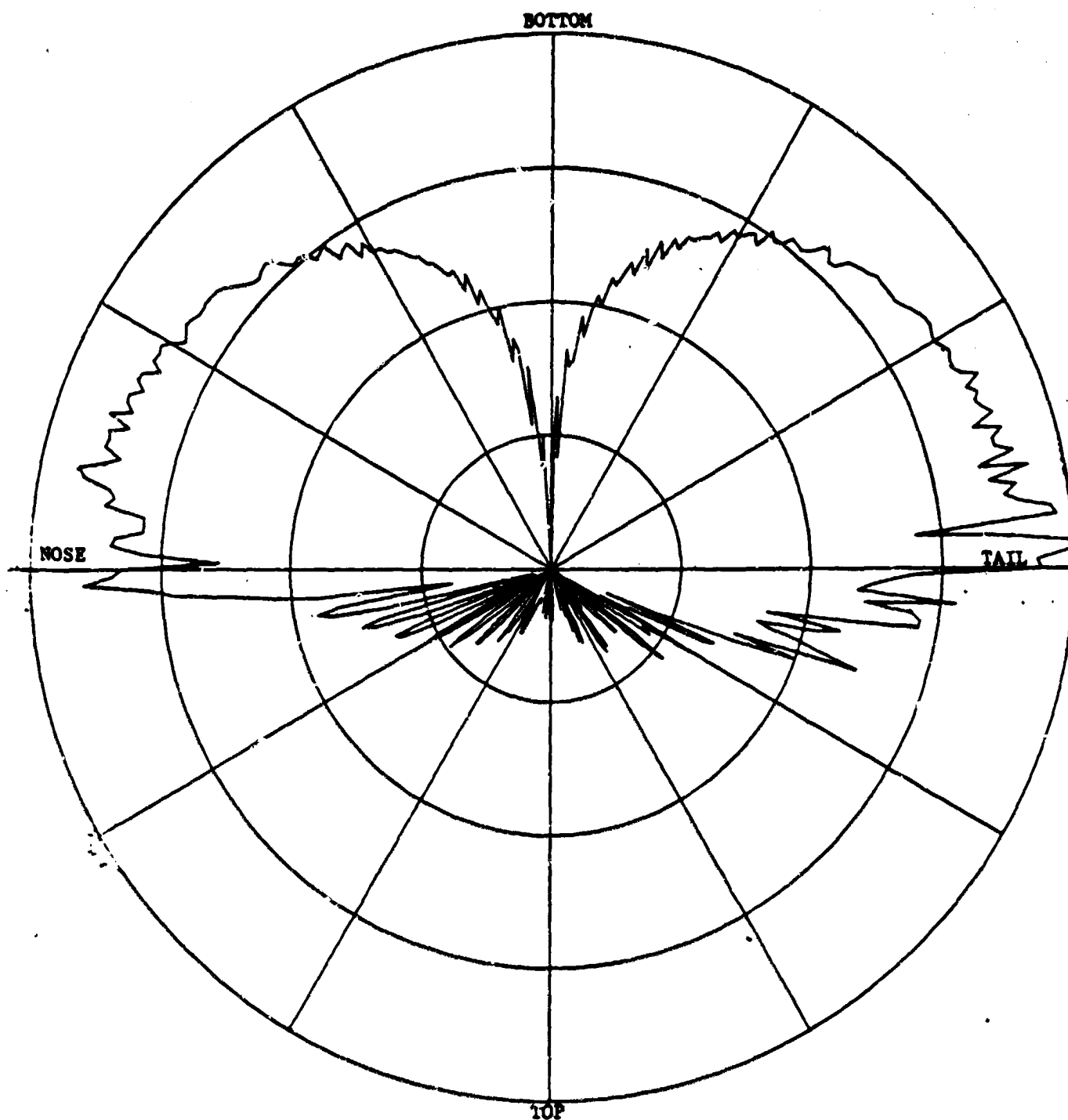


Figure II.9-3. deHavilland DHC-7. Elevation plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
64.05257553776 185.5323573471 49.09237451313 530.9130937956  
0. 0. 0.  
PG  
4 T  
45.98 125.84 -37.51  
7.26 360.58 -15.73  
7.26 360.58 15.73  
45.98 125.84 37.51  
SG  
1  
64.40770362685 0.  
0. 0. 0. 25 3  
1. 0.  
PD  
0. 0. 89.9  
0 360 1  
50000. 5.  
PP  
3.75 3  
EX

Figure II.10-1. deHavilland DHC-7. Data set for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

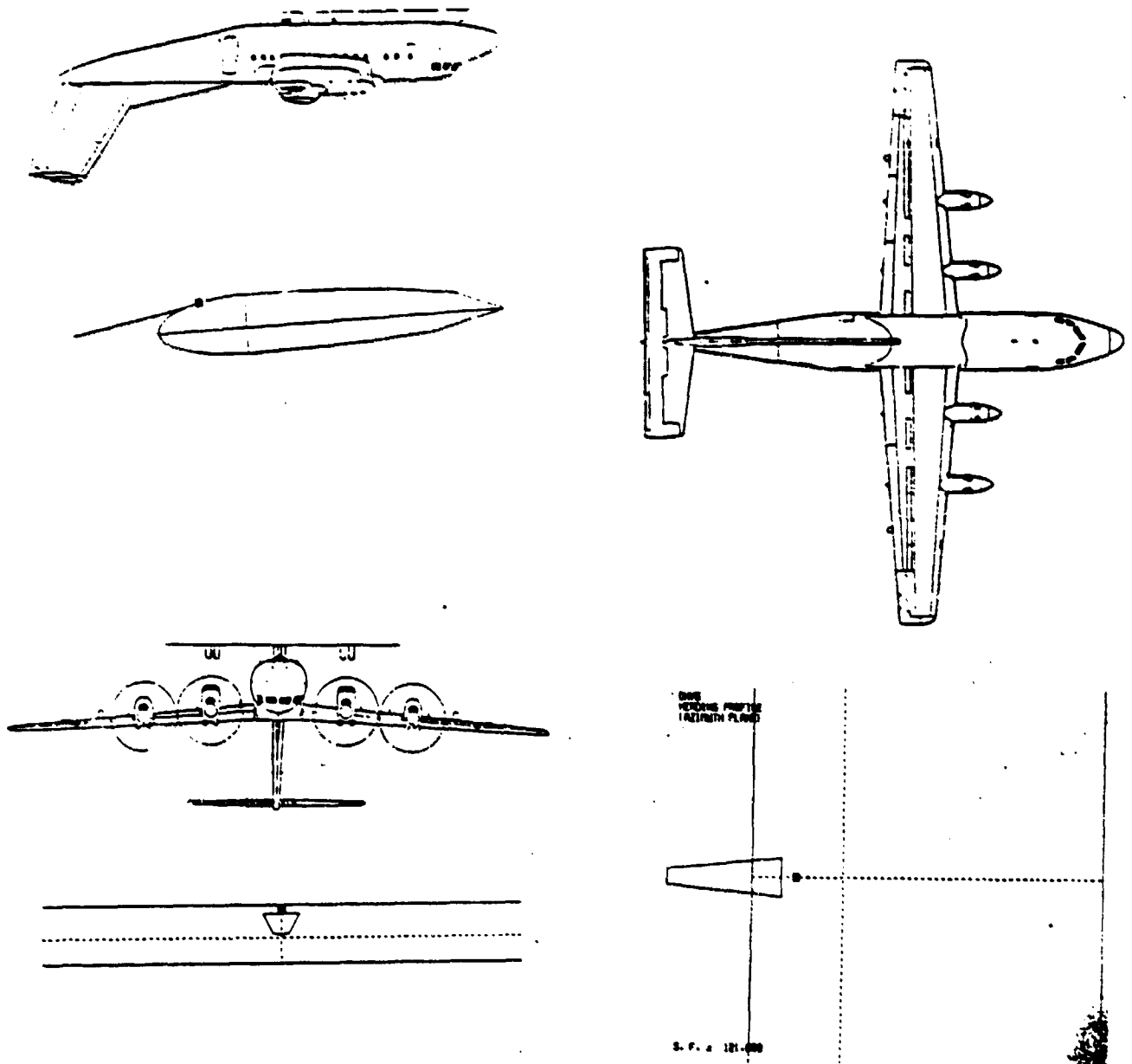


Figure II.10-2. deHavilland DHC-7. Bottom rear 1/4 wavelength monopole antenna for antenna location 5.

E-PHI  
DB PLOT

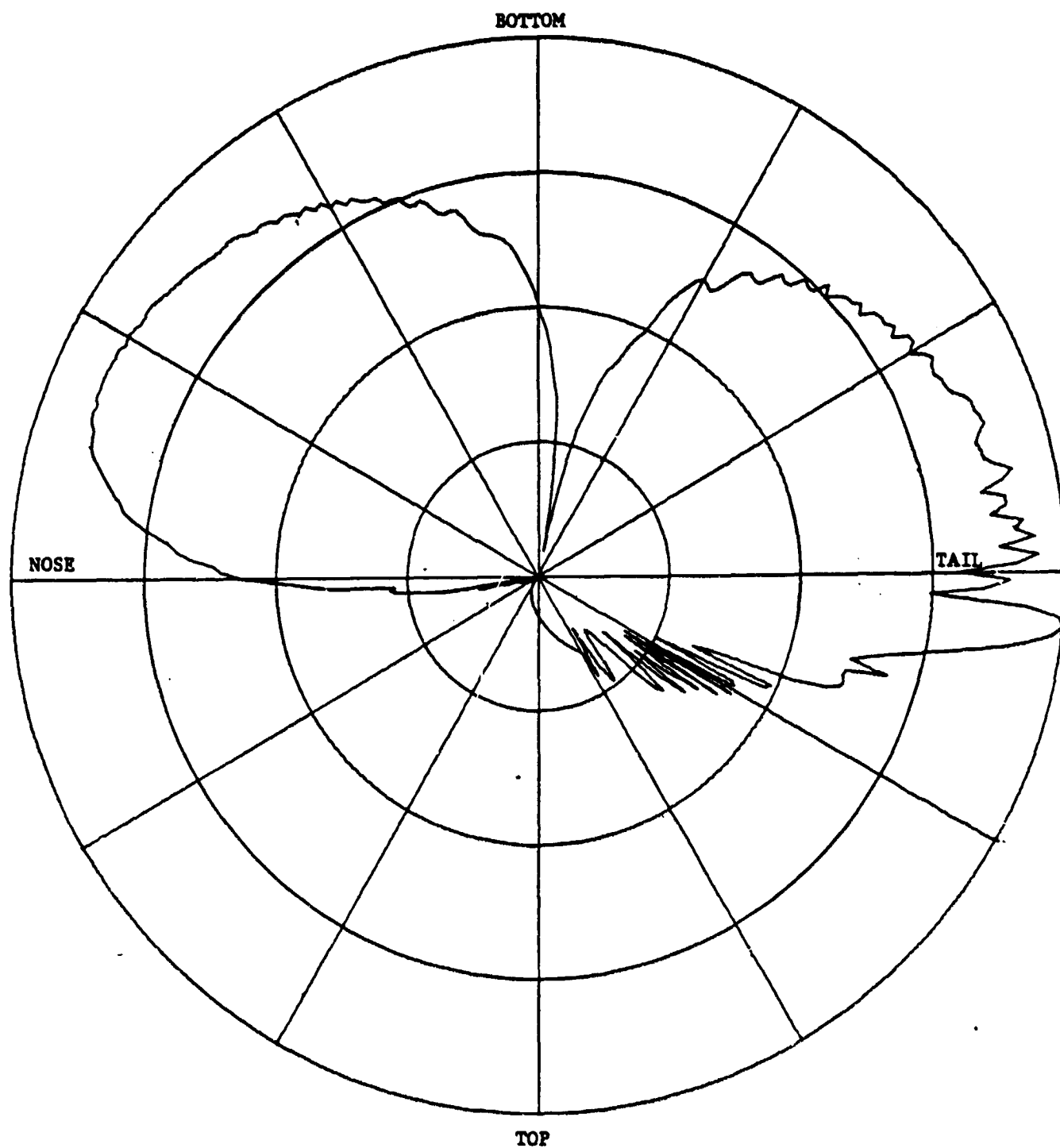


Figure II.10-3. deHavilland DHC-7. Elevation plane pattern for antenna location 5.

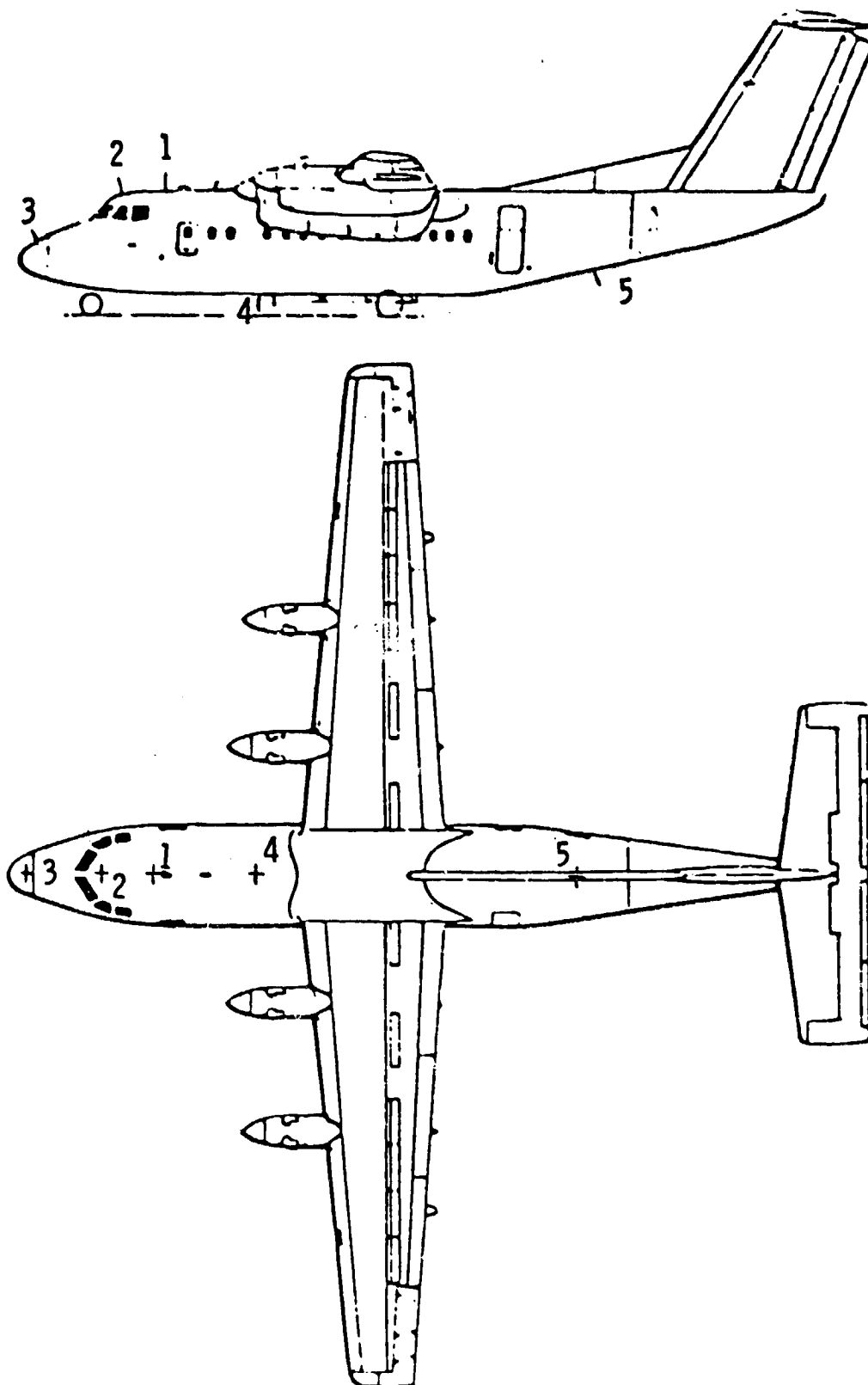


Figure 11.11. deHavilland DHC-7. Antenna locations.

```
PG
46.66695928283 57.03821242751 59.227408959 57.03821242751
0. 0. 0.
PG
4 T
41.14 7.26 105.27
82.28 552.97 150.04
82.28 552.97 235.95
41.14 7.26 268.62
PG
4 F
65.34 119.79 50.82
65.34 119.79 257.73
0. 119.79 257.73
0. 119.79 50.82
PG
4 F
65.34 119.79 50.82
65.34 157.3 50.82
65.34 157.3 257.73
65.34 119.79 257.73
PG
4 F
65.34 119. 50.82
0. 119. 50.82
0. 157.3 50.82
65.34 157.3 50.82
PG
4 F
65.34 157.3 50.82
0. 157.3 50.82
0. 157.3 257.73
65.34 157.3 257.73
PG
4 F
72.6 257.73 65.34
72.6 257.73 249.26
25.41 257.73 249.26
25.41 257.73 65.34
PG
4 F
72.6 257.73 65.34
72.6 291.61 65.34
72.6 291.61 249.26
72.6 257.73 249.26
PG
4 F
72.6 257.73 65.34
25.41 257.73 65.34
SG
1
0. -53.24
0. 0. 0. .25 3
1. 0.
PD
0. 0. 89.9
0 360 1
50000. 5.
PP
3.75 3
EX
```

Figure II.12-1. deHavilland DHC-7. Data set for antenna location 1.

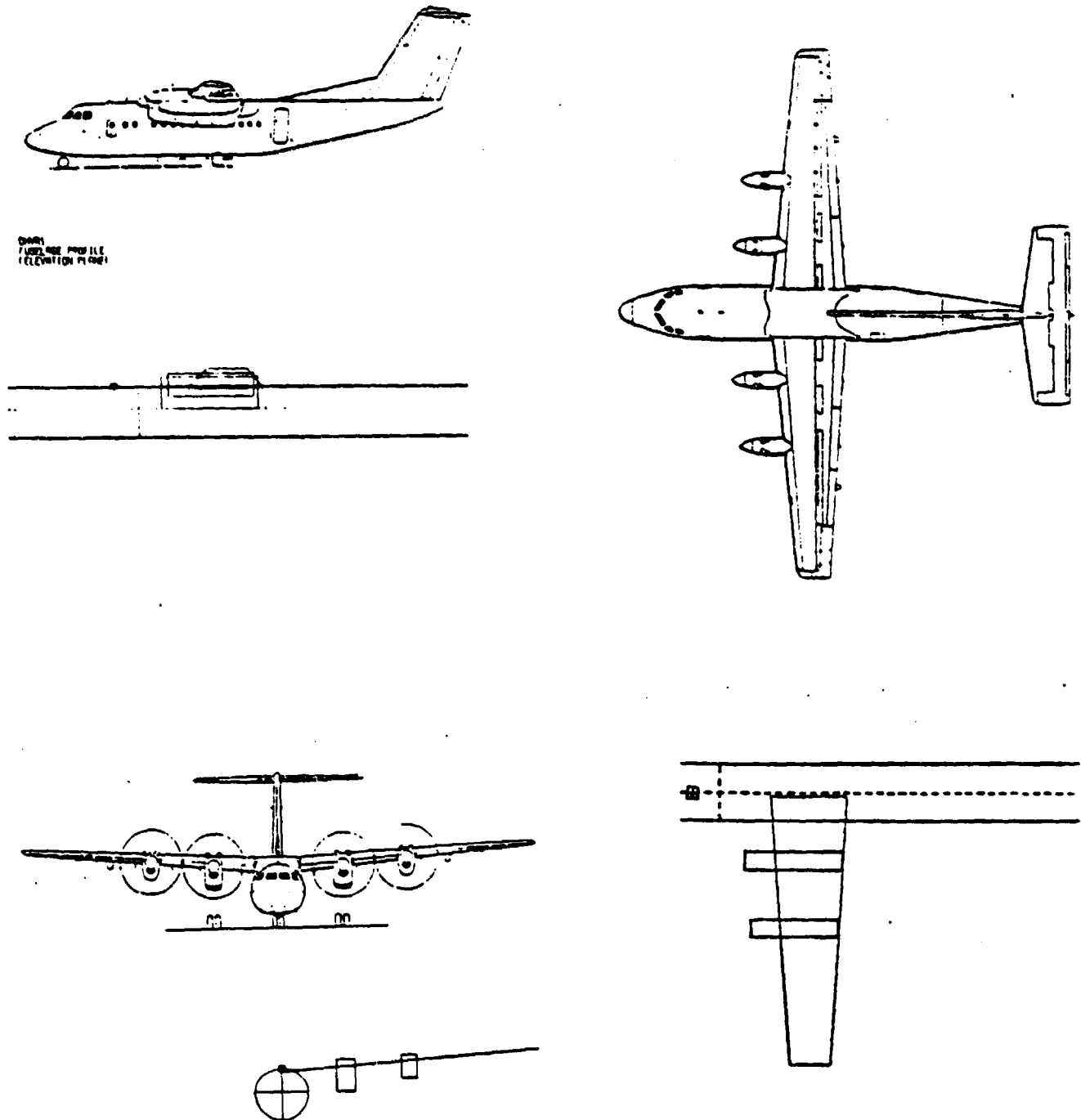


Figure II.12-2. deHavilland DHC-7. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 1.



E-PHI  
DB PLOT

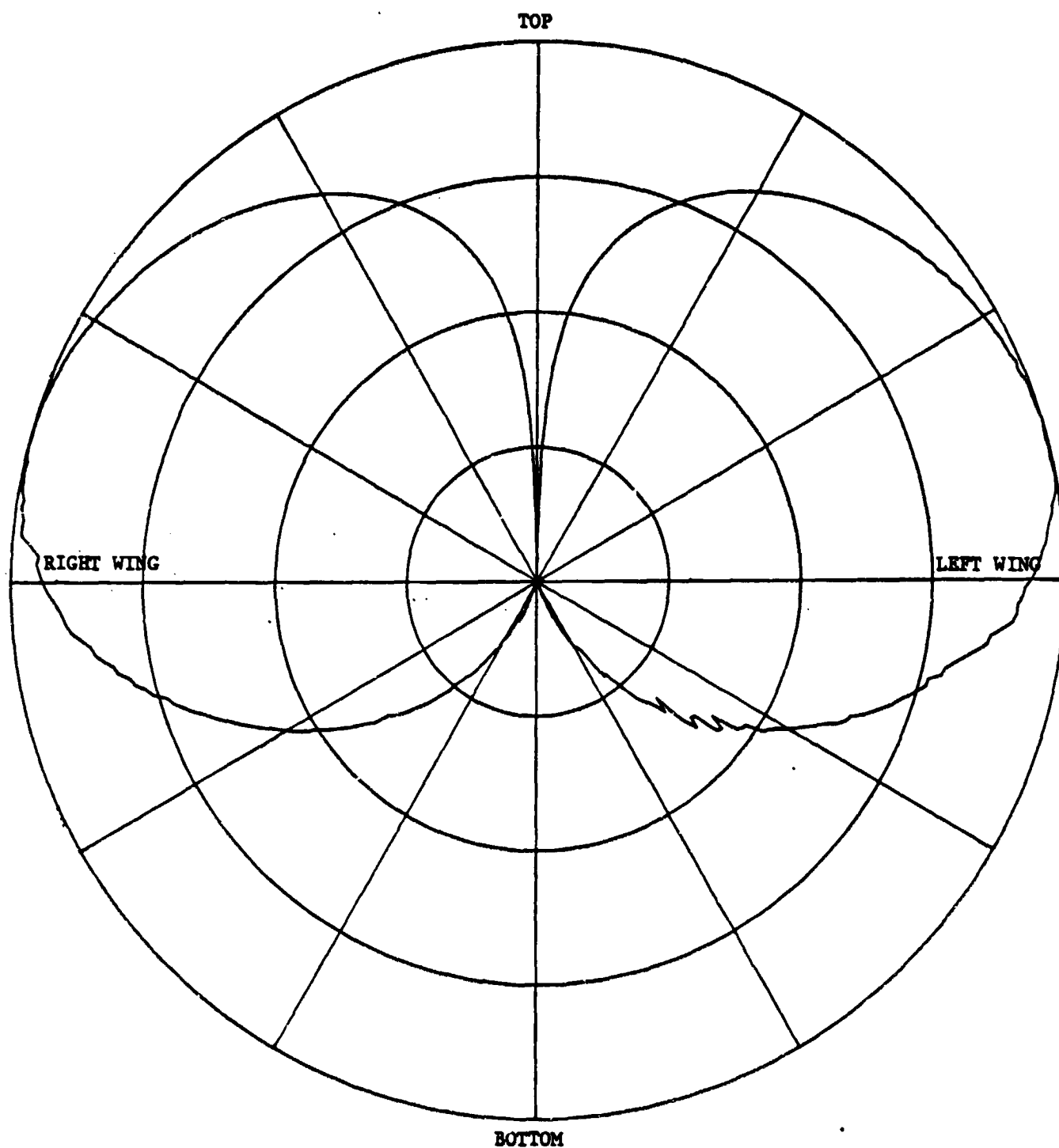


Figure II.12-3. deHavilland DHC-7. Roll plane pattern for antenna location 1.

E-PHI  
DB PLOT

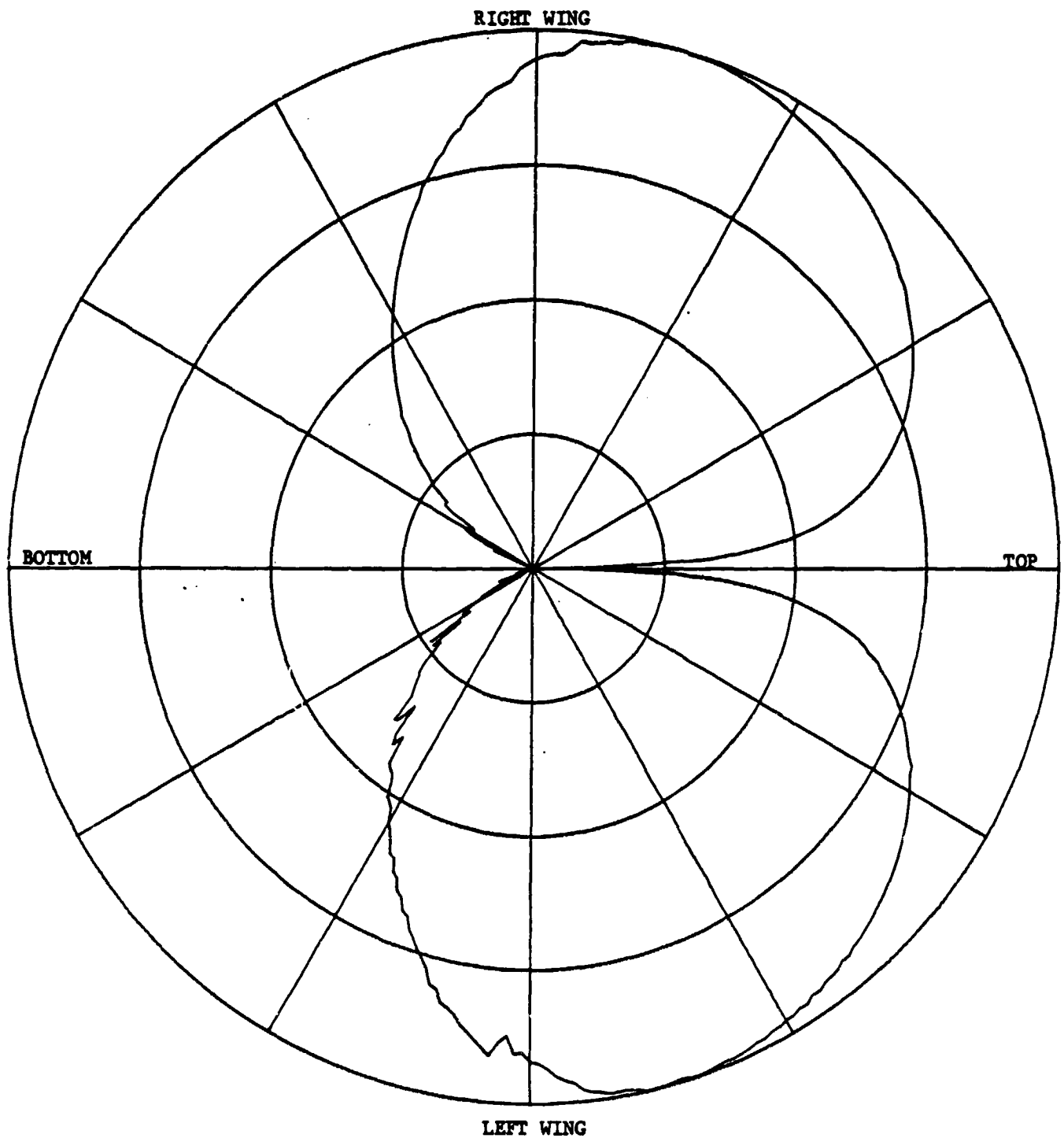


Figure II.12-4. deHavilland DHC-7. Off-roll plane pattern,  $\text{THC}=10^\circ$ , for antenna location 1.

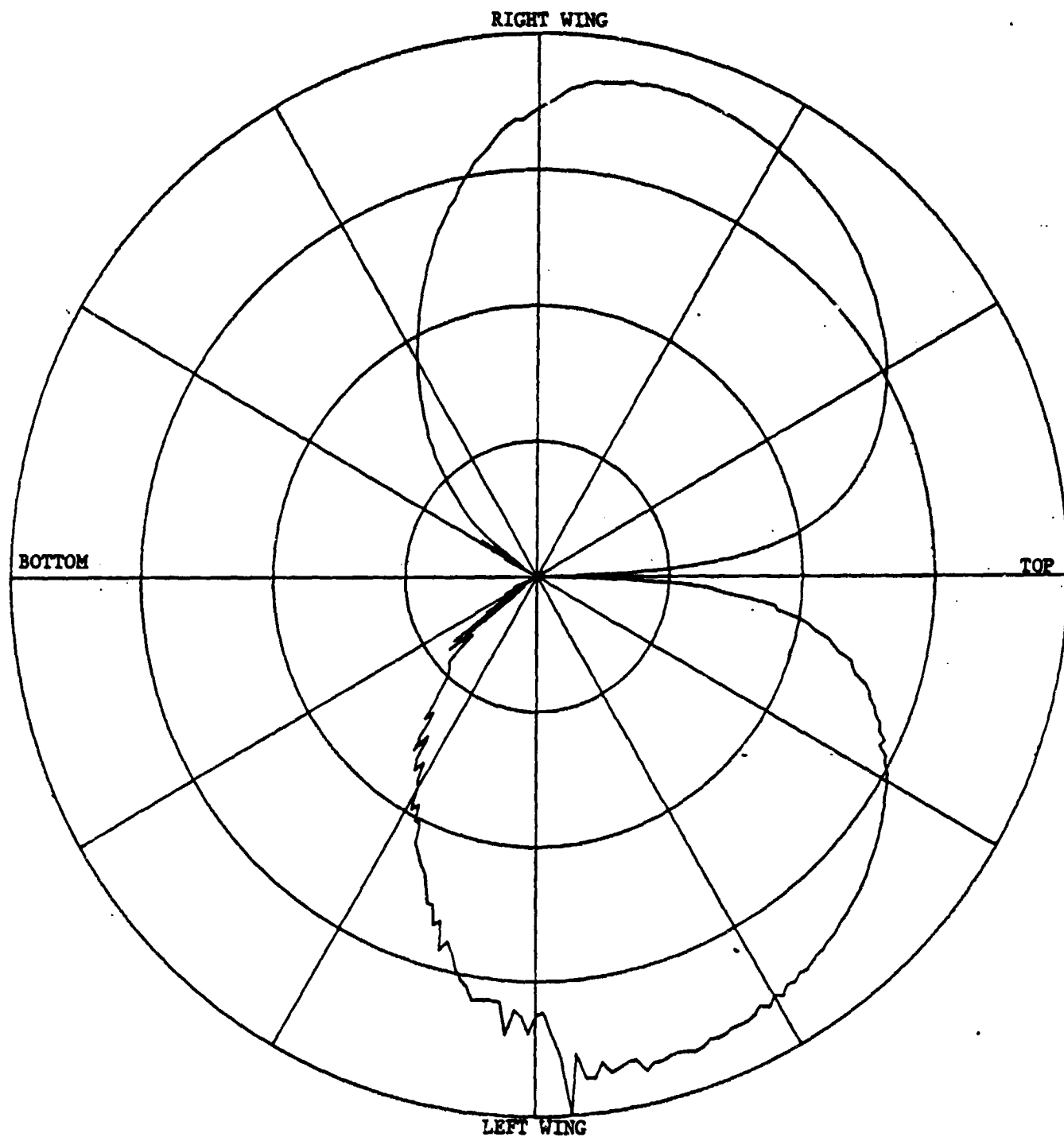


Figure II.12-5. deHavilland DHC-7. Off-roll plane pattern,  $THC=20^\circ$ , for antenna location 1.

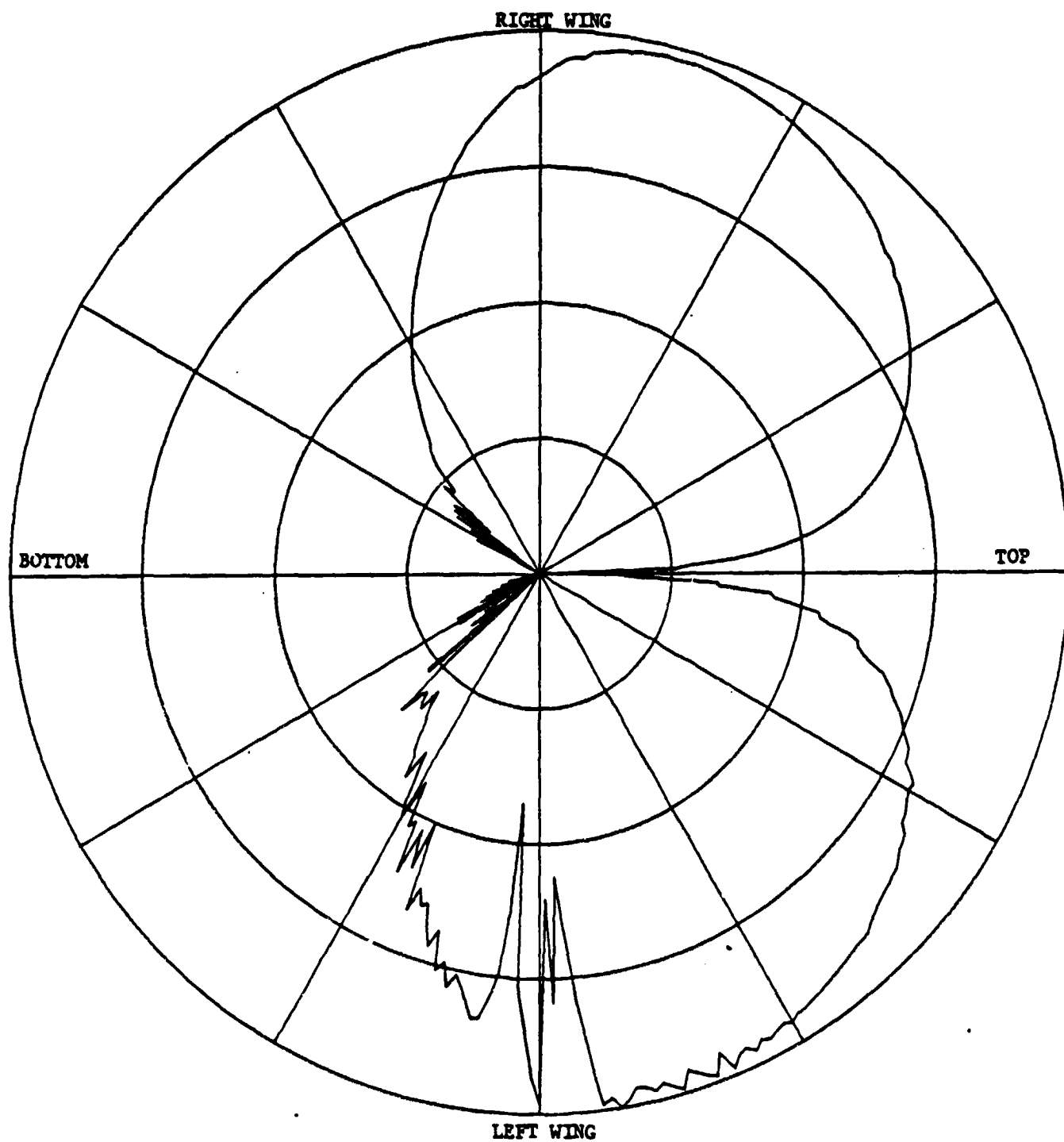


Figure II.12-6. deHavilland DHC-7. Off-roll plane pattern,  $\text{THC}=30^\circ$ , for antenna location 1.

E-PHI  
DB PLOT

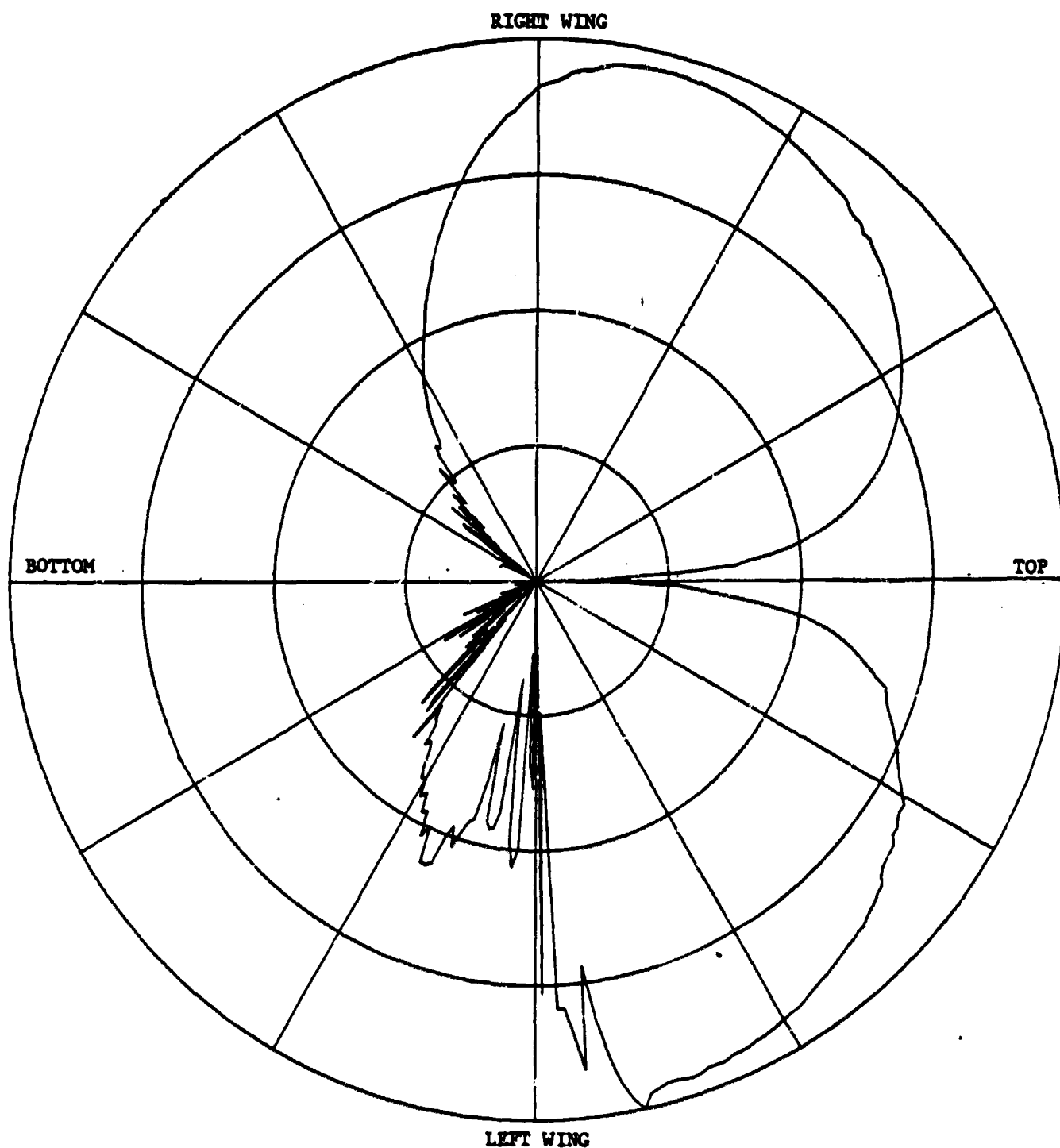


Figure II.12-7. deHavilland DHC-7. Off-roll plane pattern,  
THC=40°, for antenna location 1.

E-PHI  
DB PLOT

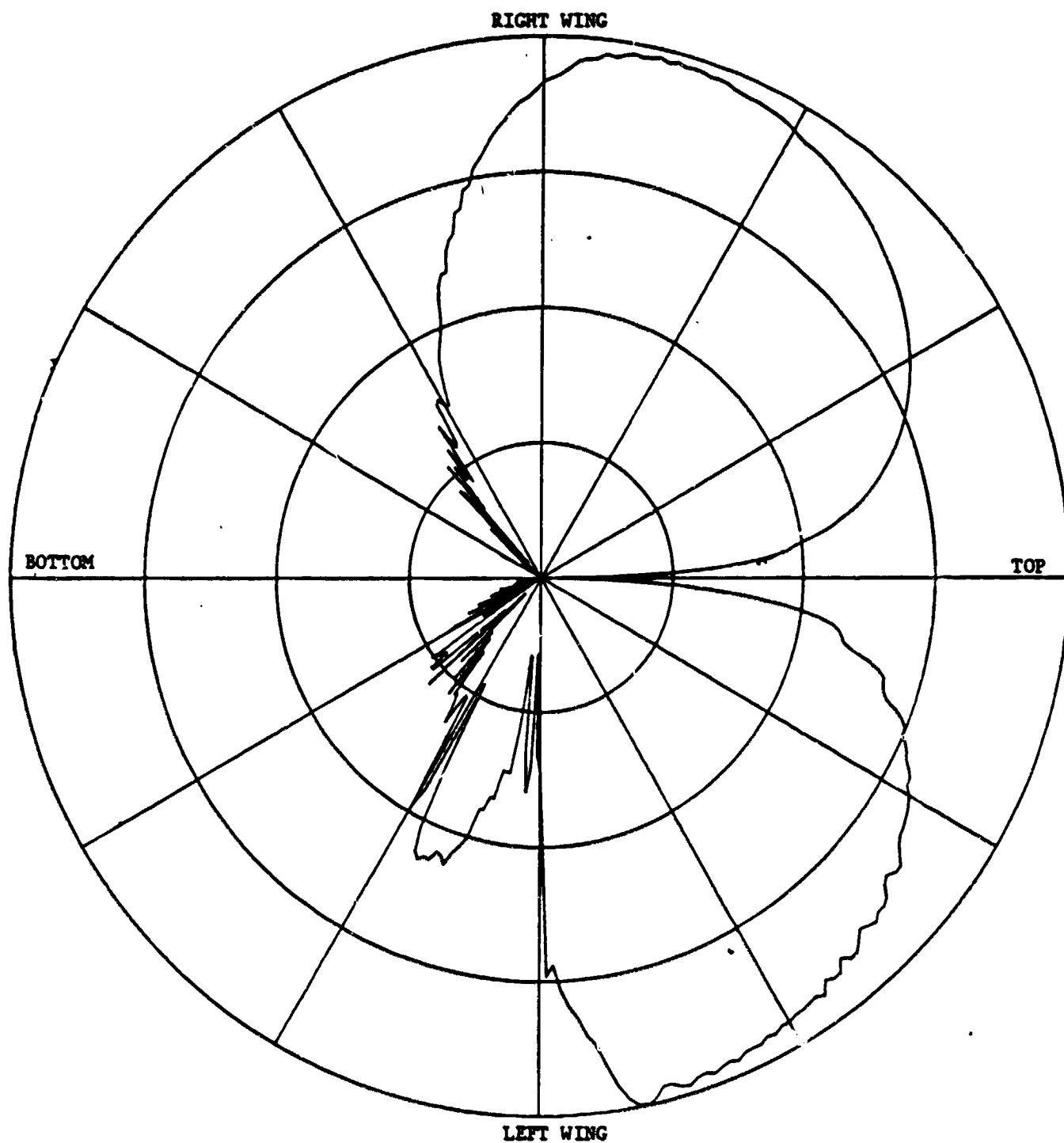


Figure II.12-8. deHavilland DHC-7. Off-roll plane pattern,  $\text{THC}=50^\circ$ , for antenna location 1.

E-PHI  
DB PLOT

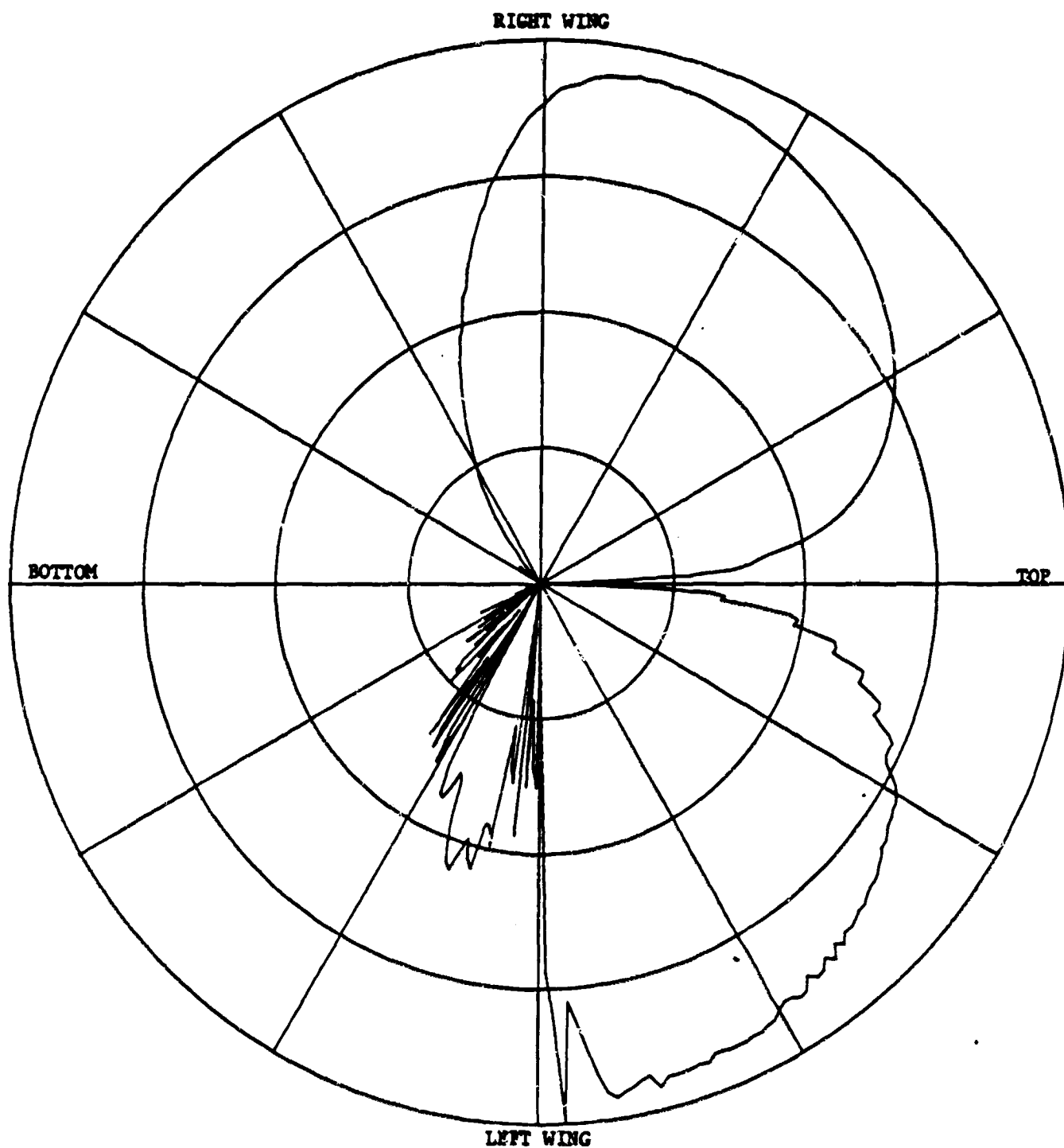


Figure II.12-9. deHavilland DHC-7. Off-roll plane pattern.  
THC=60°, for antenna location 1.

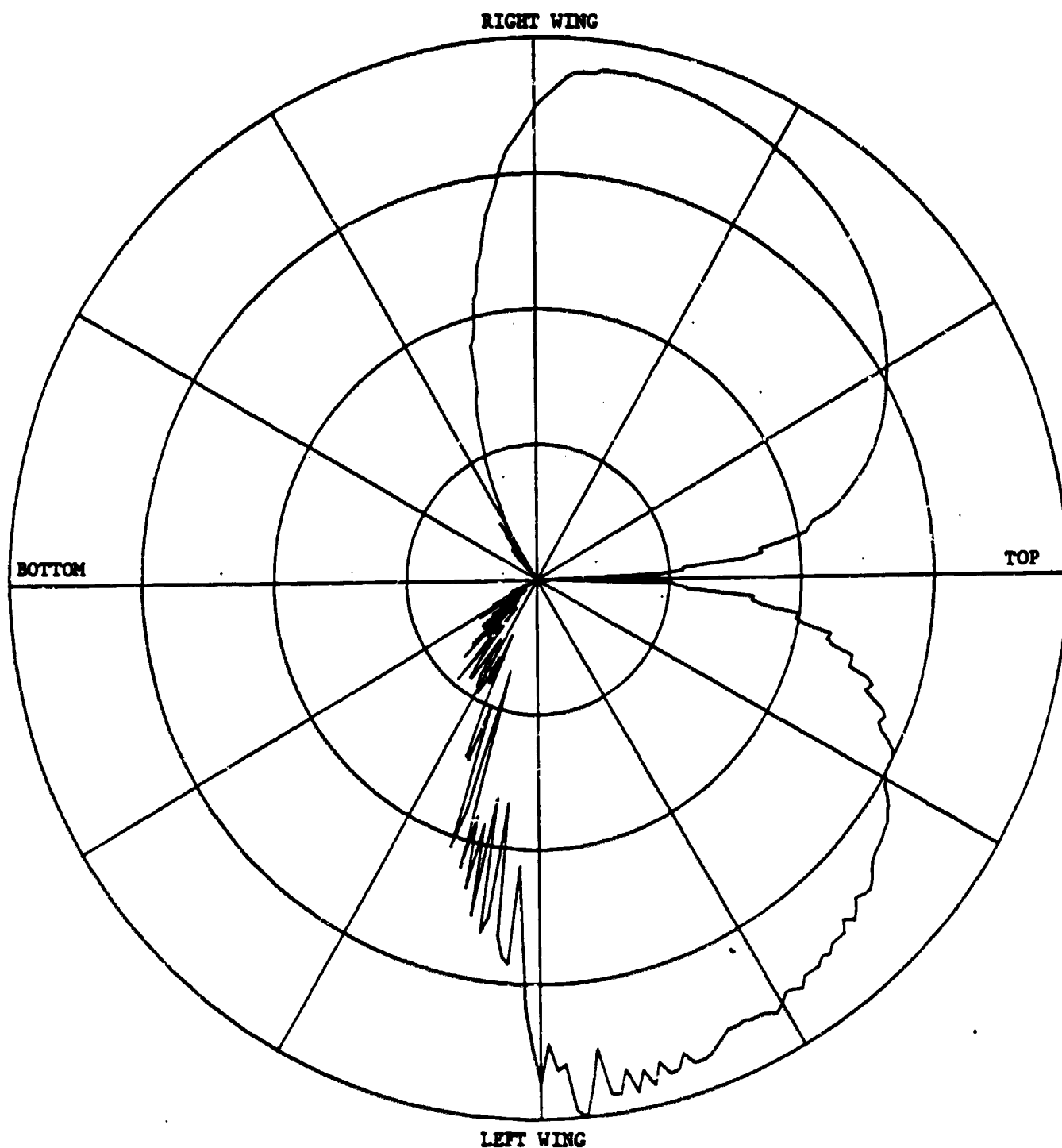


Figure II.12-10. deHavilland DHC-7. Off-roll plane pattern,  $\text{THC}=70^\circ$ , for antenna location 1.



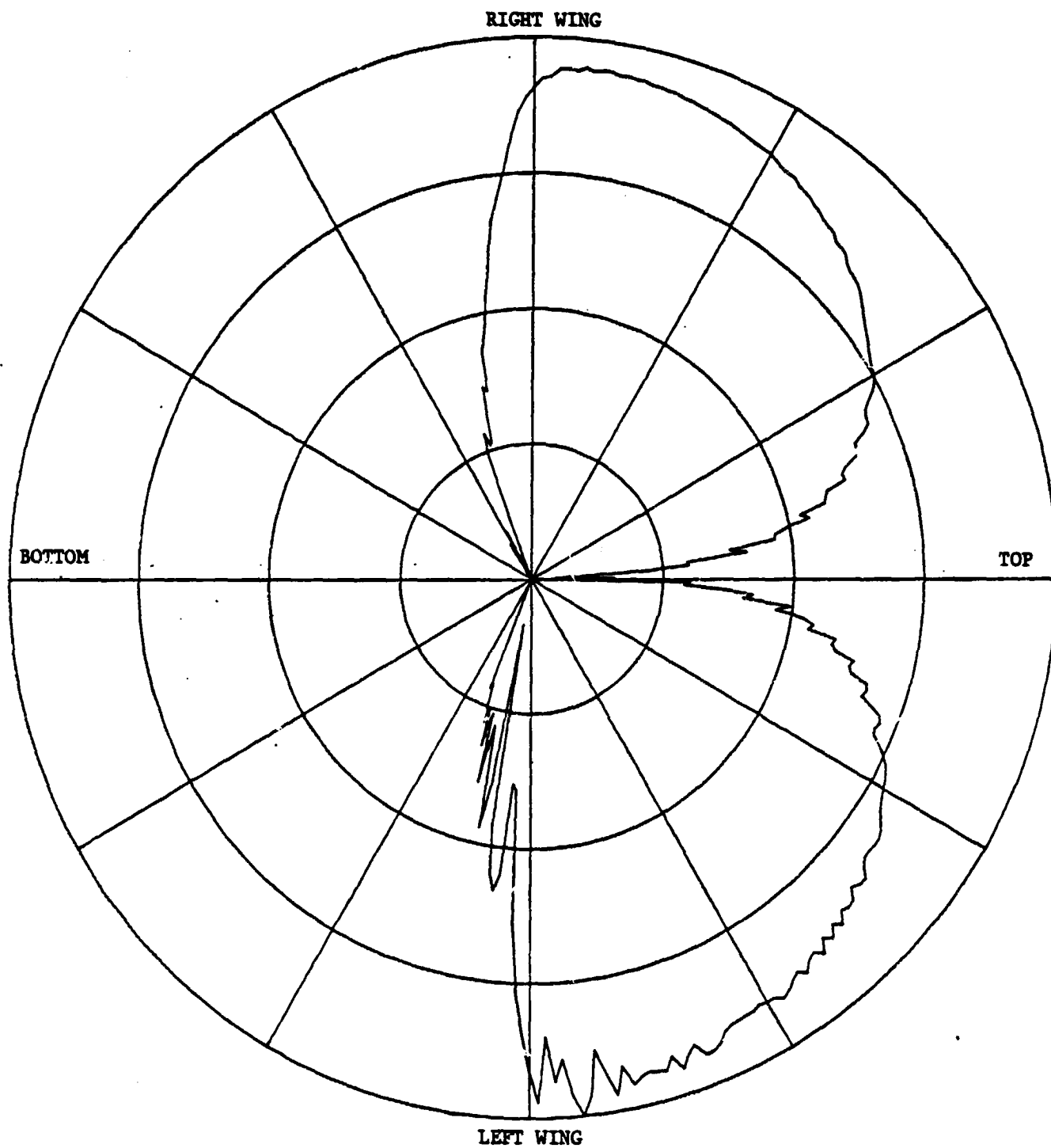


Figure II.12-11. deHavilland DHC-7. Off-roll plane pattern,  $\text{THC}=80^\circ$ , for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
43.0 53.0 56.0 53.0  
0. 0. 0.  
PG  
4 T  
41.14 7.26 105.27  
82.28 552.97 150.04  
82.28 552.97 235.95  
41.14 7.26 268.62  
PG  
4 F  
65.34 119.79 50.82  
65.34 119.79 257.73  
0. 119.79 257.73  
0. 119.79 50.82  
PG  
4 F  
65.34 119.79 50.82  
65.34 157.3 50.82  
65.34 157.3 257.73  
65.34 119.79 257.73  
PG  
4 F  
65.34 119. 50.82  
0. 119. 50.82  
0. 157.3 50.82  
65.34 157.3 50.82  
PG  
4 F  
65.34 157.3 50.82  
0. 157.3 50.82  
0. 157.3 257.73  
65.34 157.3 257.73  
PG  
4 F  
72.6 257.73 65.34  
72.6 257.73 249.26  
25.41 257.73 249.26  
25.41 257.73 65.34  
PG  
4 F  
72.6 257.73 65.34  
72.6 291.61 65.34  
72.6 291.61 249.26  
72.6 257.73 249.26  
PG  
4 F  
72.6 257.73 65.34  
25.41 257.73 65.34

25.41 291.61 65.34  
72.6 291.61 65.34  
PG  
4 F  
25.41 257.73 65.34  
25.41 257.73 249.26  
25.41 291.61 249.26  
25.41 291.61 65.34  
PG  
4 F  
72.6 291.61 65.34  
25.41 291.61 65.34  
25.41 291.61 249.26  
72.6 291.61 249.26  
SG  
1  
0. -111.32  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 89.9  
0 360 1  
50000. 5.  
PP  
3.75 3  
EX

Figure II.13-1. deHavilland DHC-7. Data set for antenna location 2.

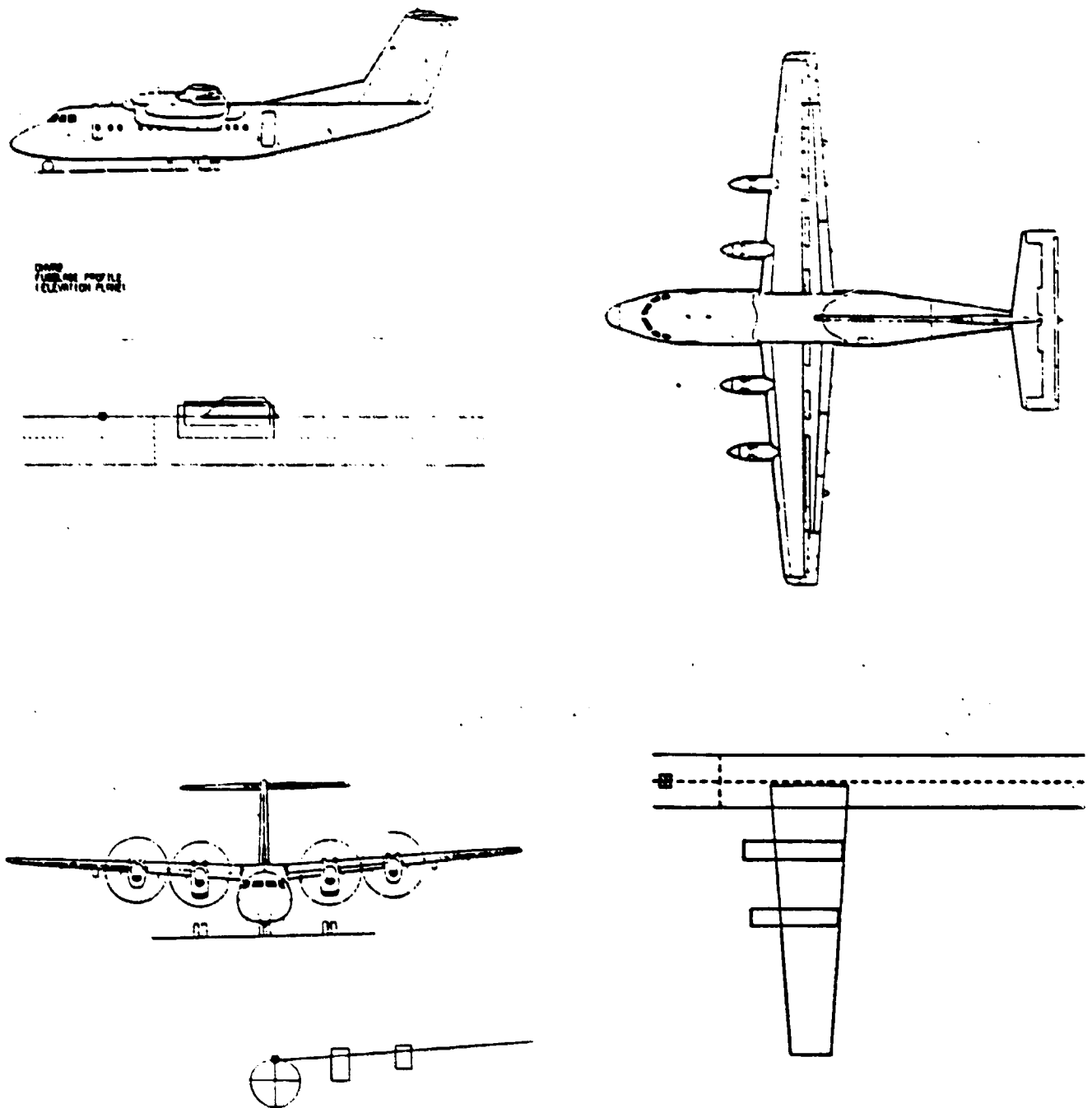


Figure II.13-2. deHavilland DHC-7. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

E-PHI  
DB PLOT

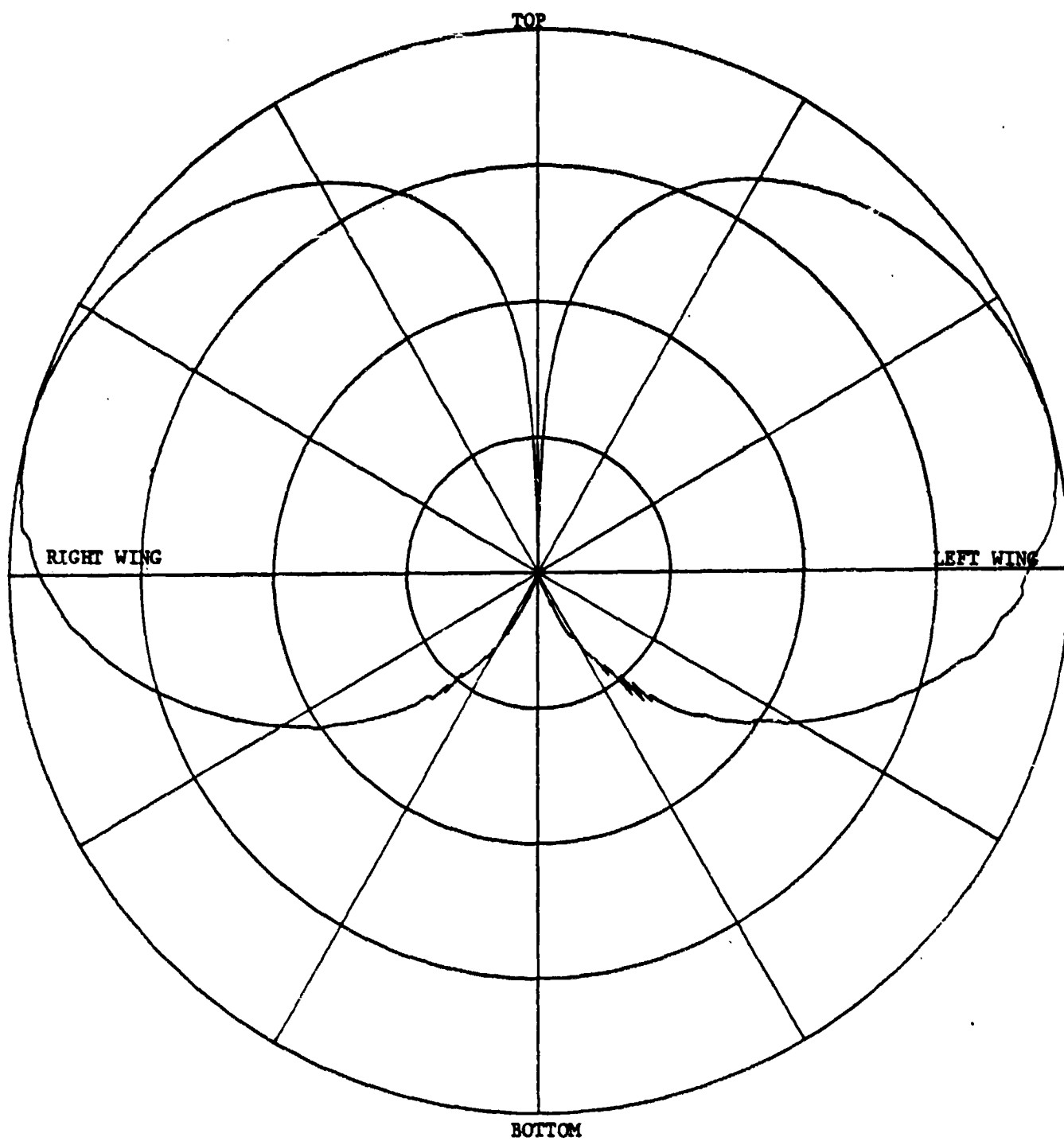


Figure II.13-3. deHavilland DHC-7. Roll plane pattern for antenna location 2.

E-PHI  
DB PLOT

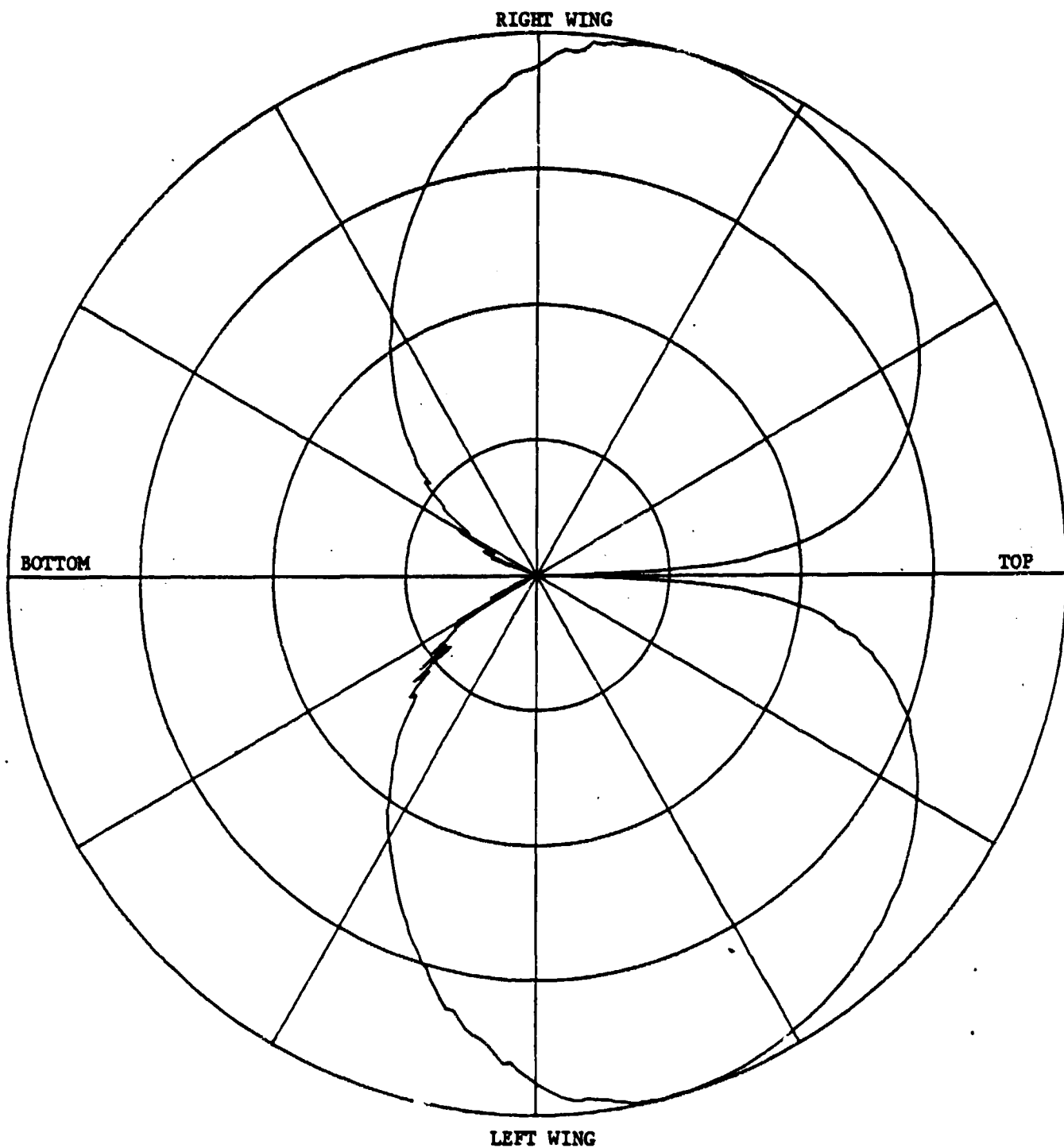


Figure II.13-4. deHavilland DHC-7. Off-roll plane pattern,  
THC=10°, for antenna location 2.

E-PHI  
DB PLOT

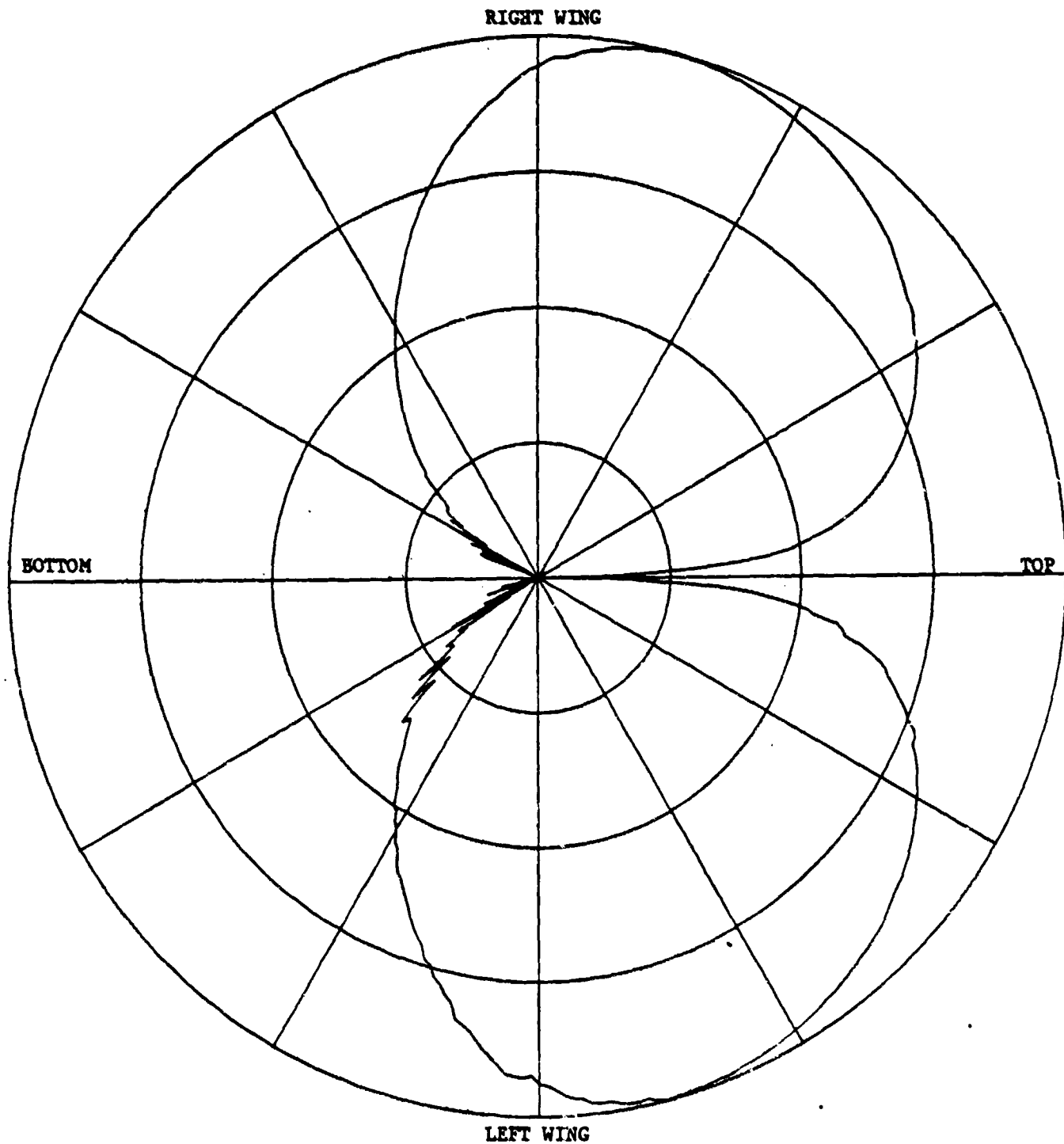


Figure II.13-5. deHavilland DHC-7. Off-roll plane pattern,  
THC=20°, for antenna location 2.

E-PHI  
DB PLOT

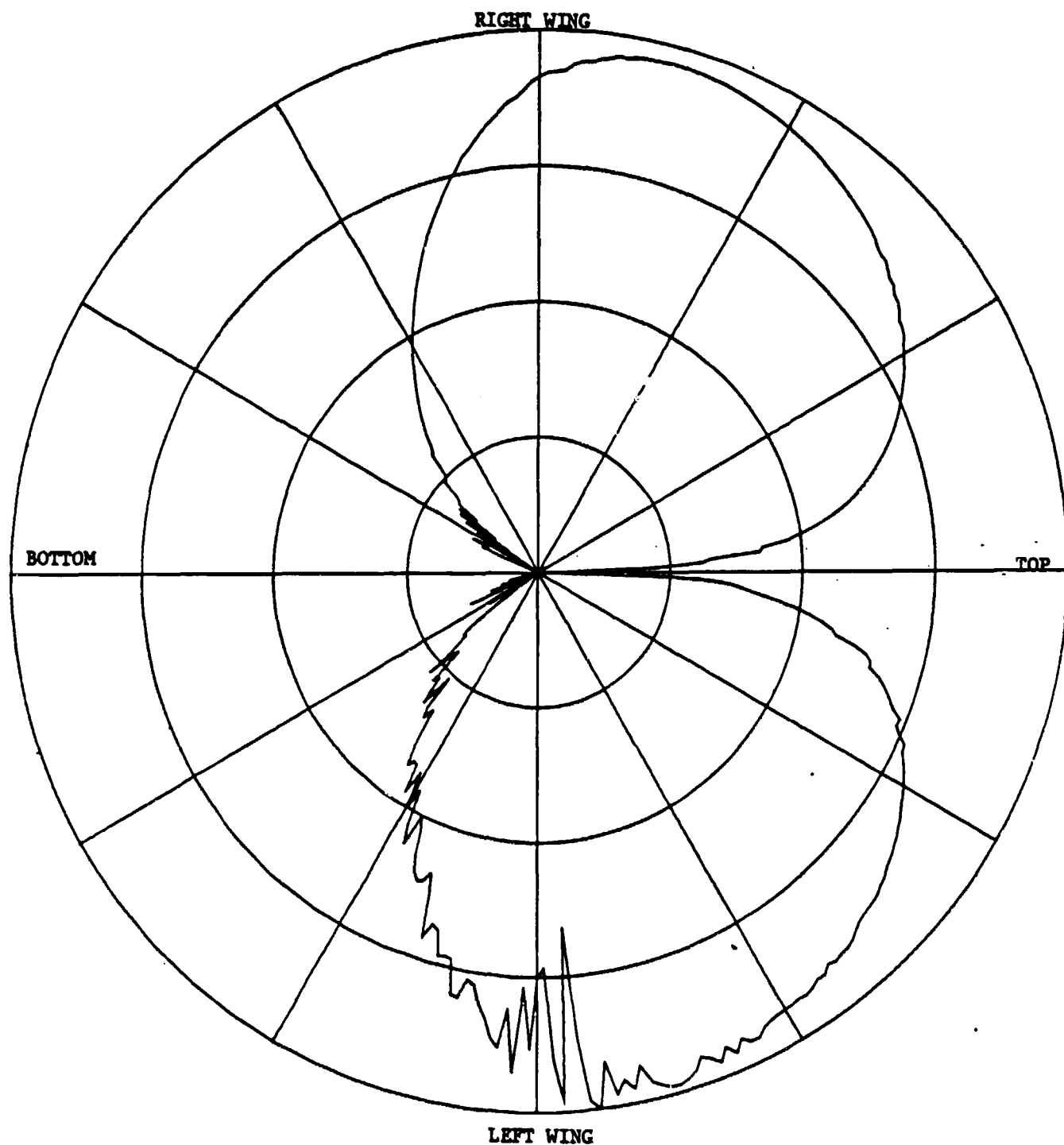


Figure II.13-6. deHavilland DHC-7. Off-roll plane pattern,  
THC=30°, for antenna location 2.

E-PHI  
DB PLOT

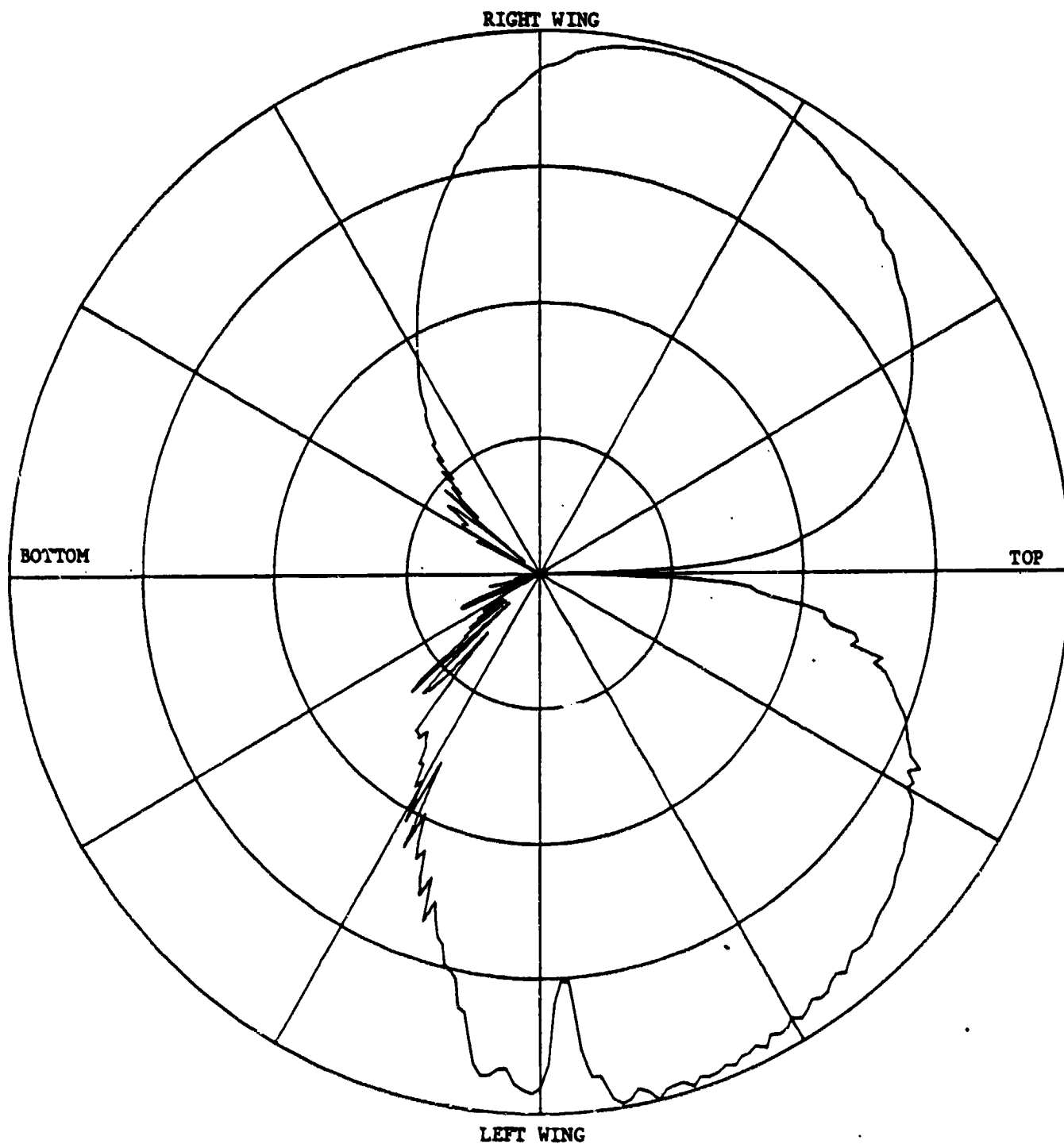


Figure II.13-7. deHavilland DHC-7. Off-roll plane pattern,  $\text{THC}=40^\circ$ , for antenna location 2.



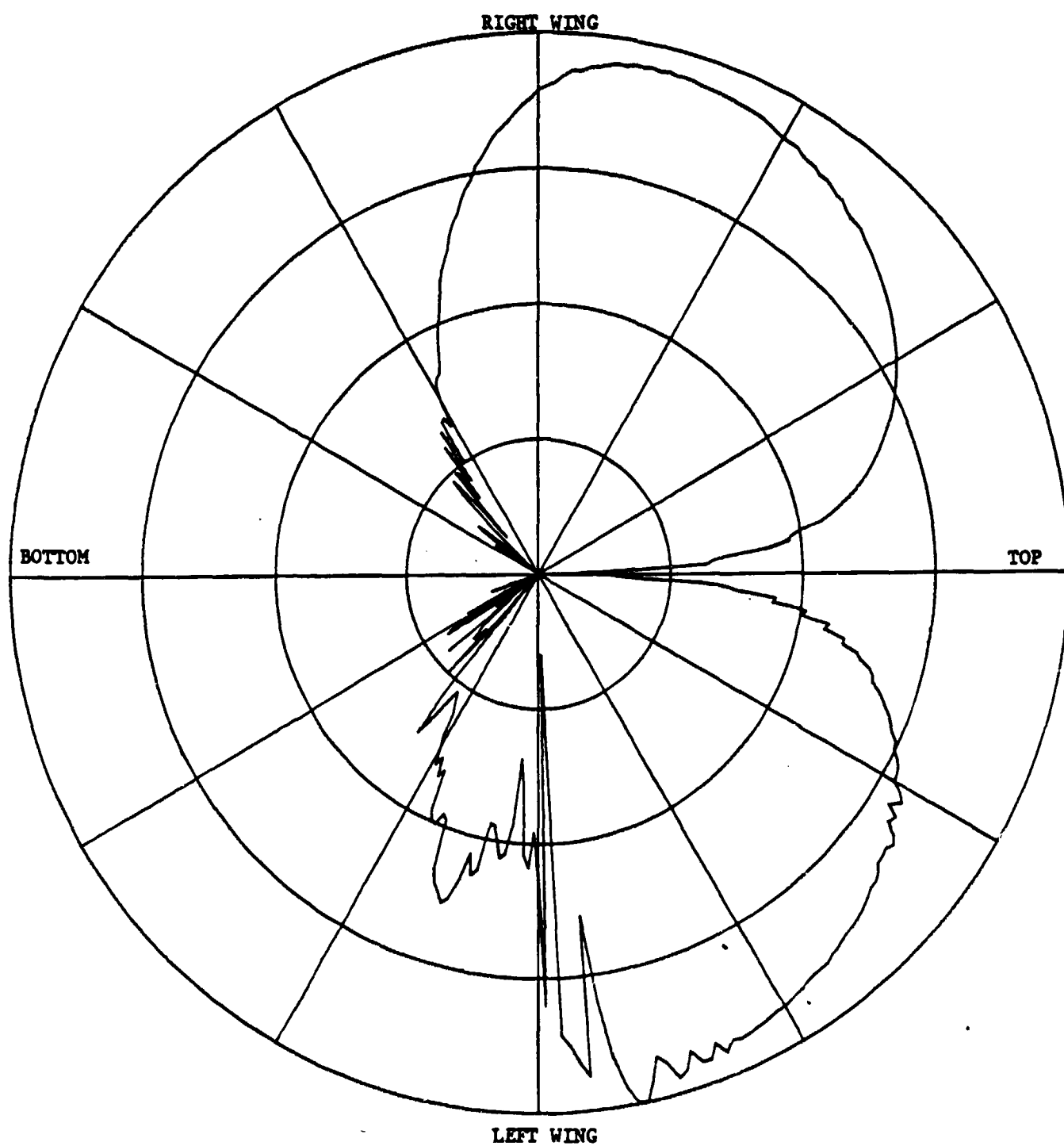


Figure II.13-8. deHavilland DHC-7. Off-roll plane pattern,  $\text{THC}=50^\circ$ , for antenna location 2.

E-PHI  
DB PLOT

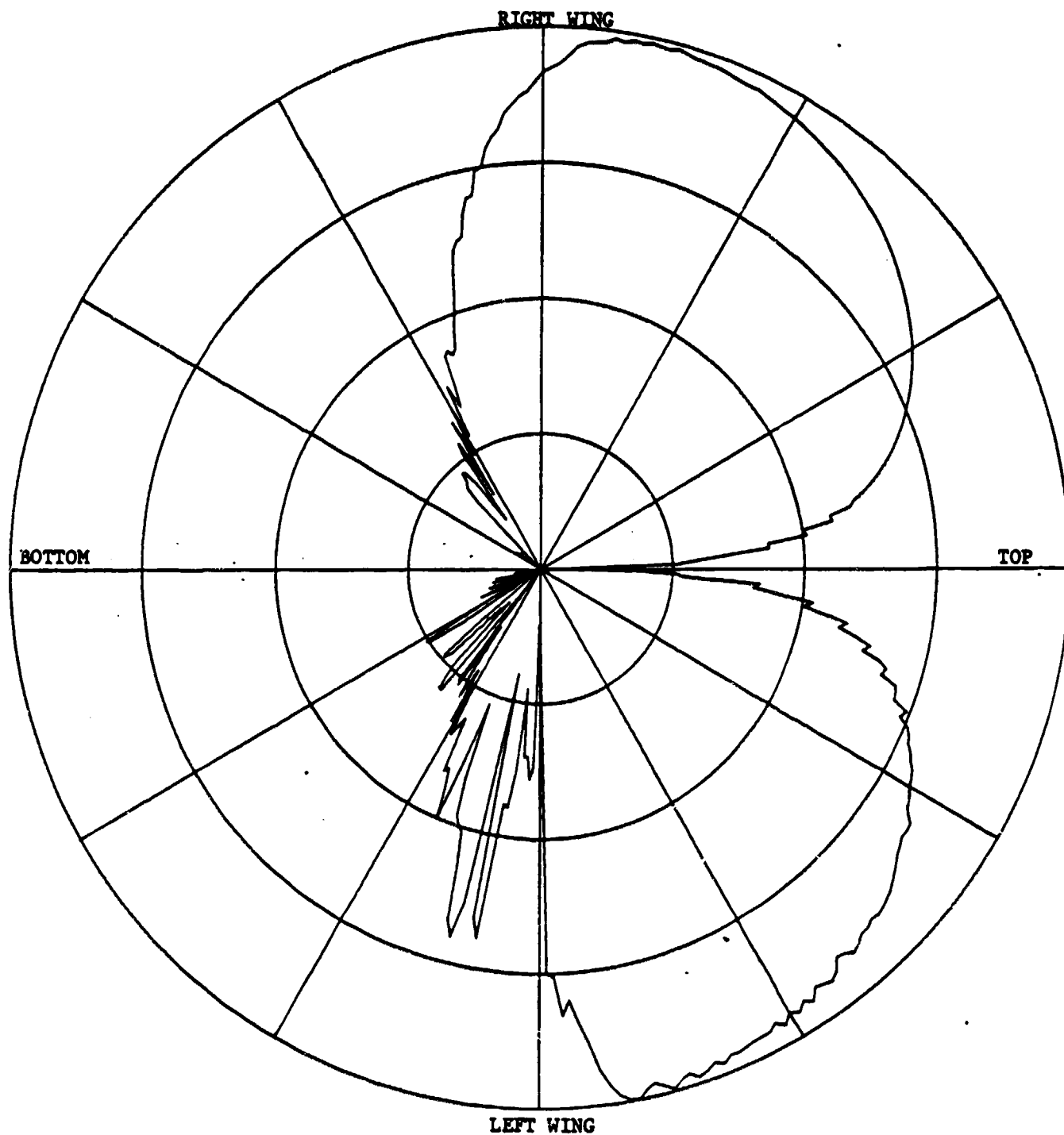


Figure II.13-9. deHavilland DHC-7. Off-roll plane pattern,  $\text{THC}=60^\circ$ , for antenna location 2.

E-PHI  
DB PLOT

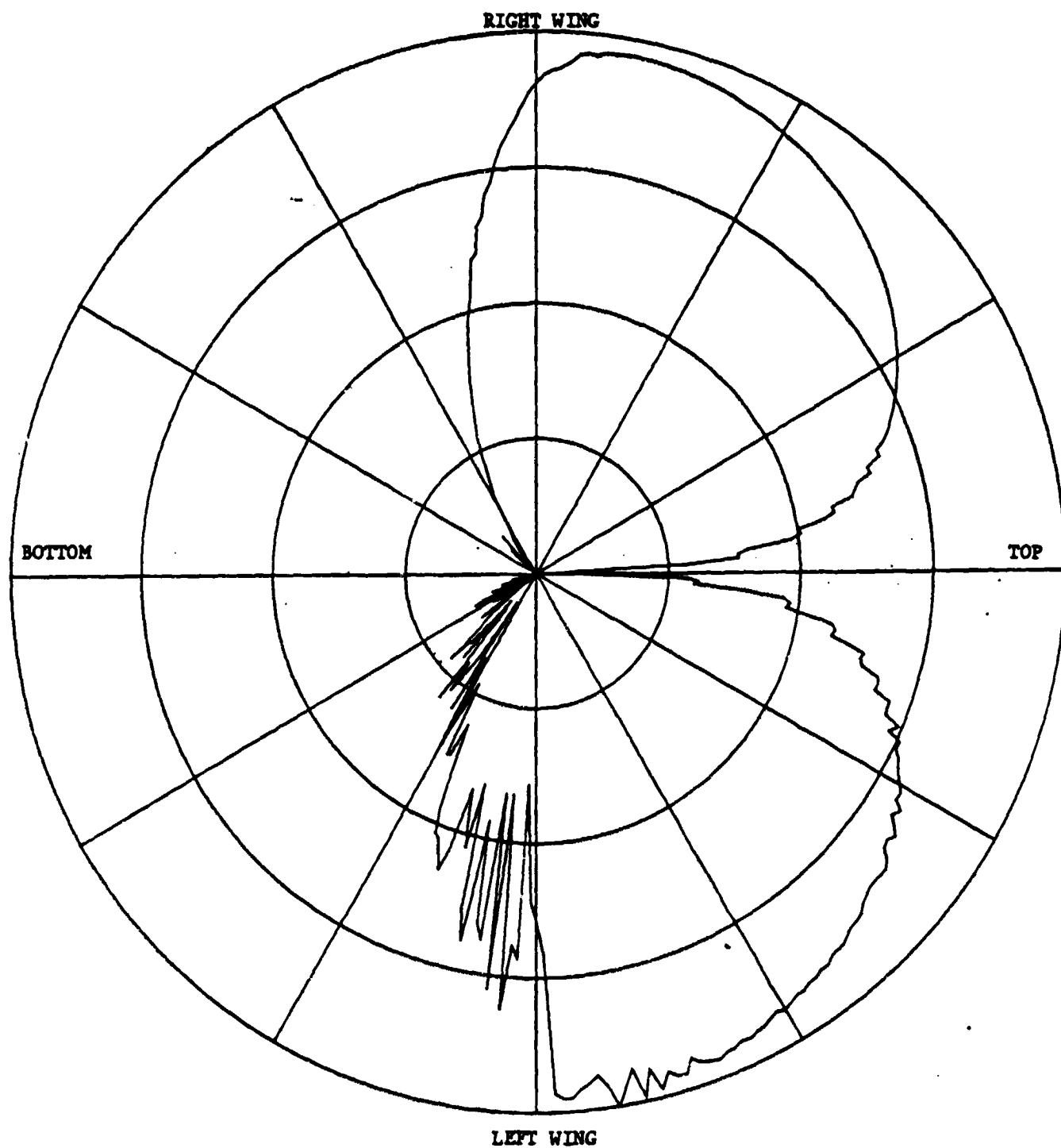


Figure II.13-10. deHavilland DHC-7. Off-roll plane pattern,  $\text{THC}=70^\circ$ , for antenna location 2.

E-PHI  
DB PLOT

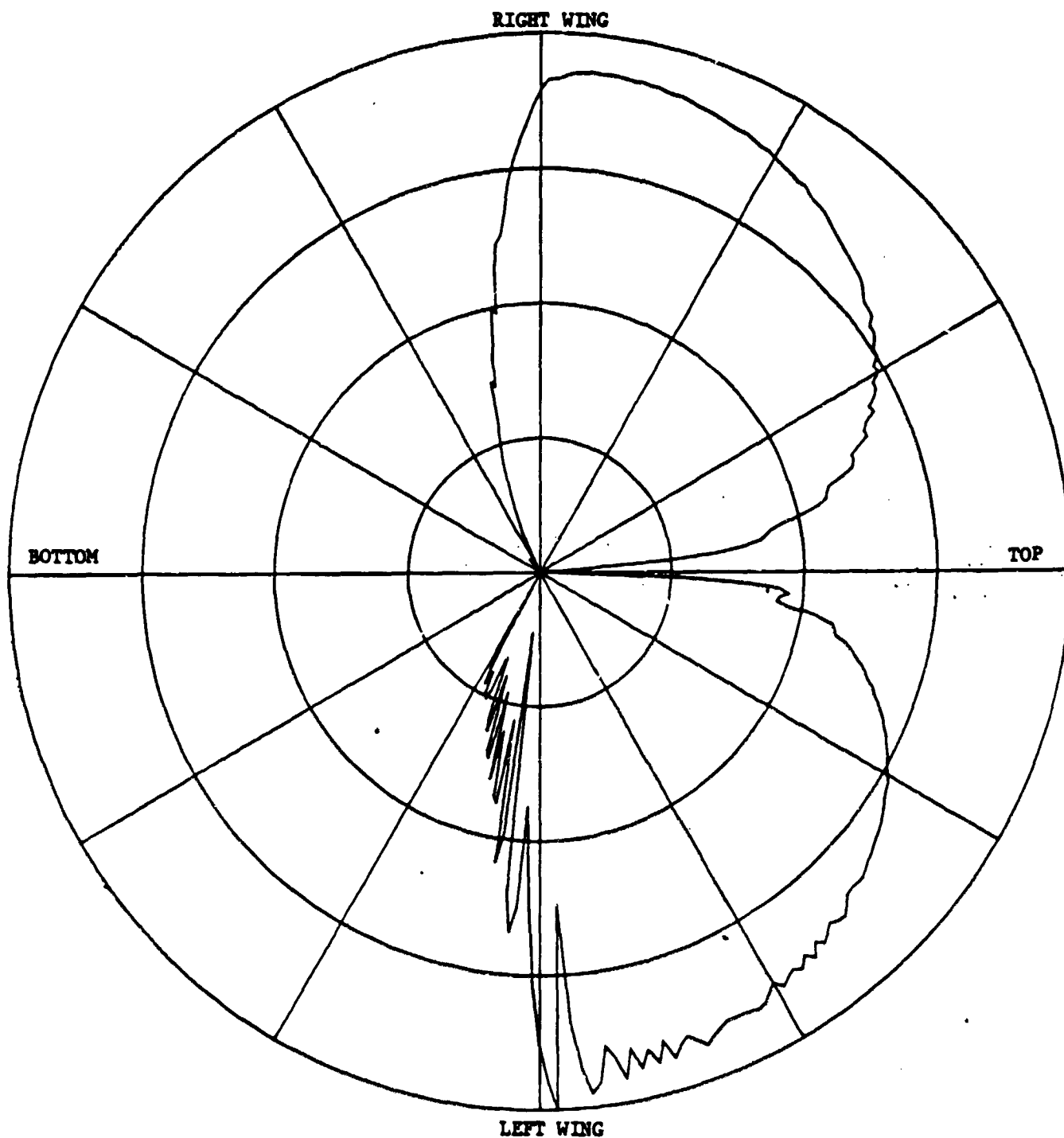


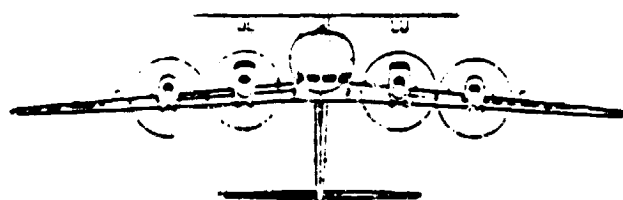
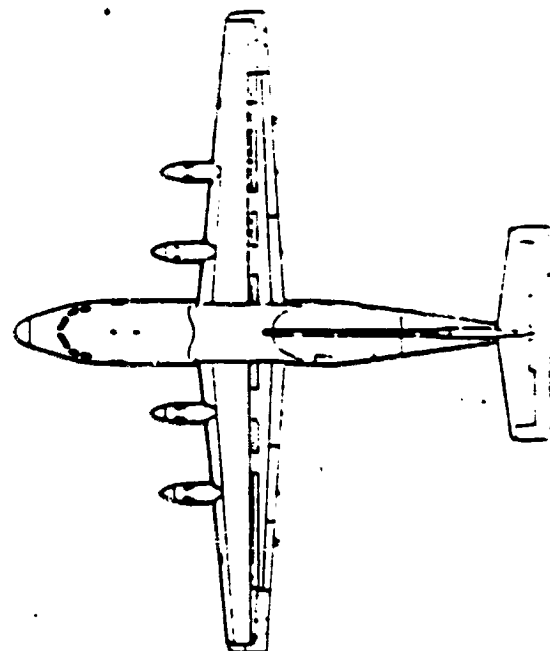
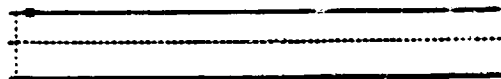
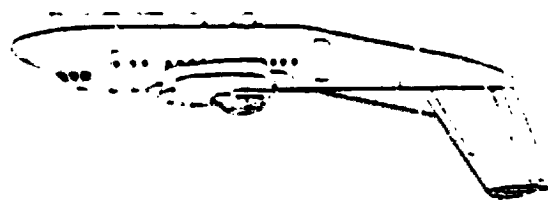
Figure II.13-11. deHavilland DHC-7. Off-roll plane pattern,  $\text{THC}=80^\circ$ , for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	50.	57.	62.	57.
	0.	0.	0.	
SG				
1	0.	22.45		
	0.	0.	0.	.25 3
	1.	0.		
PD	0.	0.	90.	
	0	360	I	
	50000.	5.2		
PP	3.75	3		
EX				

Figure II.14-1. deHavilland DEC-7. Data set for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY



ANTENNA  
LOCATION

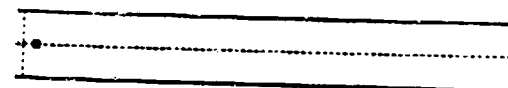


Figure II.14-2. deHavilland DHC-7. Bottom 1/4 wavelength  
monopole antenna for antenna location 4.

E-PHI  
DB PLOT

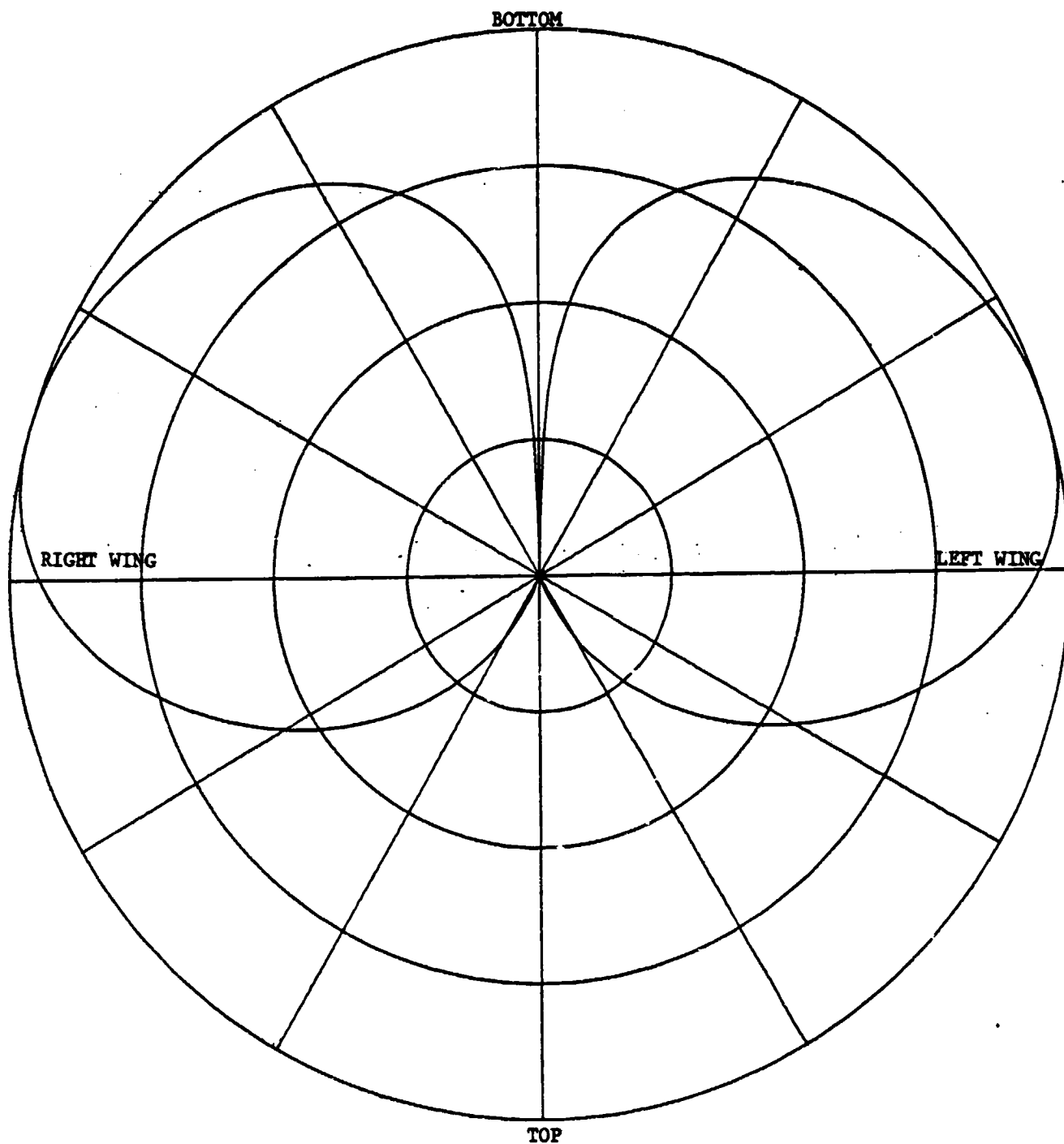


Figure II.14-3. deHavilland DHC-7. Roll plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

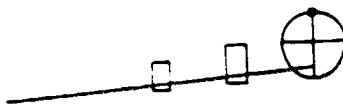
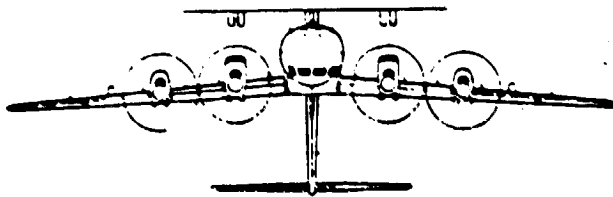
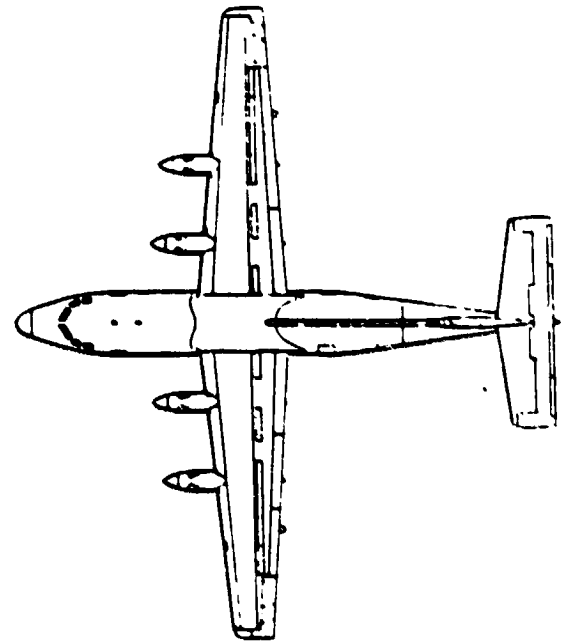
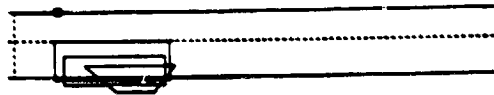
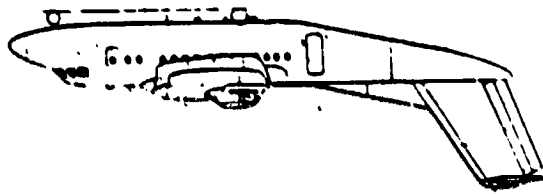
PG  
50. 27. 62. 27.  
0. 0. 0.  
PG  
4 I  
-42.35 -1.21 269.19  
-87.12 -554.18 249.26  
-87.12 -554.18 180.29  
-42.35 -1.21 122.21  
PG  
4 F  
-1.21 -121. 70.18  
-1.21 -121. 278.3  
-1.21 -158.51 278.3  
-1.21 -158.51 70.18  
PG  
4 F  
-1.21 -121. 70.18  
-66.55 -121. 70.18  
-66.55 -121. 278.3  
-1.21 -121. 278.3  
PG  
4 F  
-66.55 -121. 70.18  
-66.55 -158.51 70.18  
-66.55 -158.51 278.3  
-66.55 -121. 278.3  
PG  
4 F  
-66.55 -158.51 70.18  
-1.21 -158.51 70.18  
-1.21 -158.51 278.3  
-66.55 -158.51 278.3  
PG  
4 F  
-1.21 -121. 70.18  
-1.21 -158.51 70.18  
-66.55 -158.51 70.18  
-66.55 -121. 70.18  
PG  
4 F  
-26.62 -260.15 85.91  
-26.62 -260.15 269.83  
-26.62 -292.82 269.83  
-26.62 -292.82 85.91  
PG  
4 F  
-75.02 -260.15 85.91  
-75.02 -260.15 269.83

-26.62 -260.15 269.83  
-26.62 -260.15 85.91  
PG  
4 F  
-75.02 -292.82 85.91  
-26.62 -292.82 85.91  
-26.62 -292.82 269.83  
-75.02 -292.82 269.83  
PG  
4 F  
-26.62 -260.15 85.91  
-26.62 -292.82 85.91  
-75.02 -292.82 85.91  
-75.02 -260.15 85.91  
SG  
1  
0. 75.02  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.15-1. deHavilland DHC-7. Data set with wings for antenna location 4.



ORIGINAL PAGE IS  
OF POOR QUALITY



DHVRNA  
NEEDING PROFILE  
(AZIMUTH PROFILE)

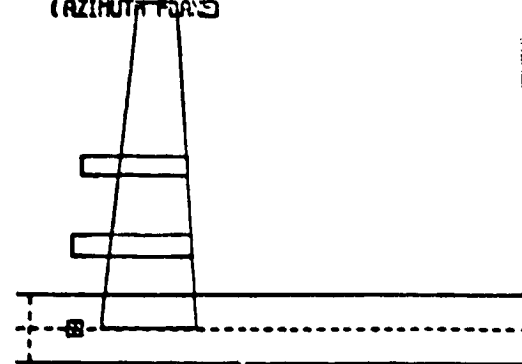


Figure II.15-2. deHavilland DHC-7. Bottom  $1/4$  wavelength  
monopole antenna for antenna location 4.

E-PHI  
DB PLOT

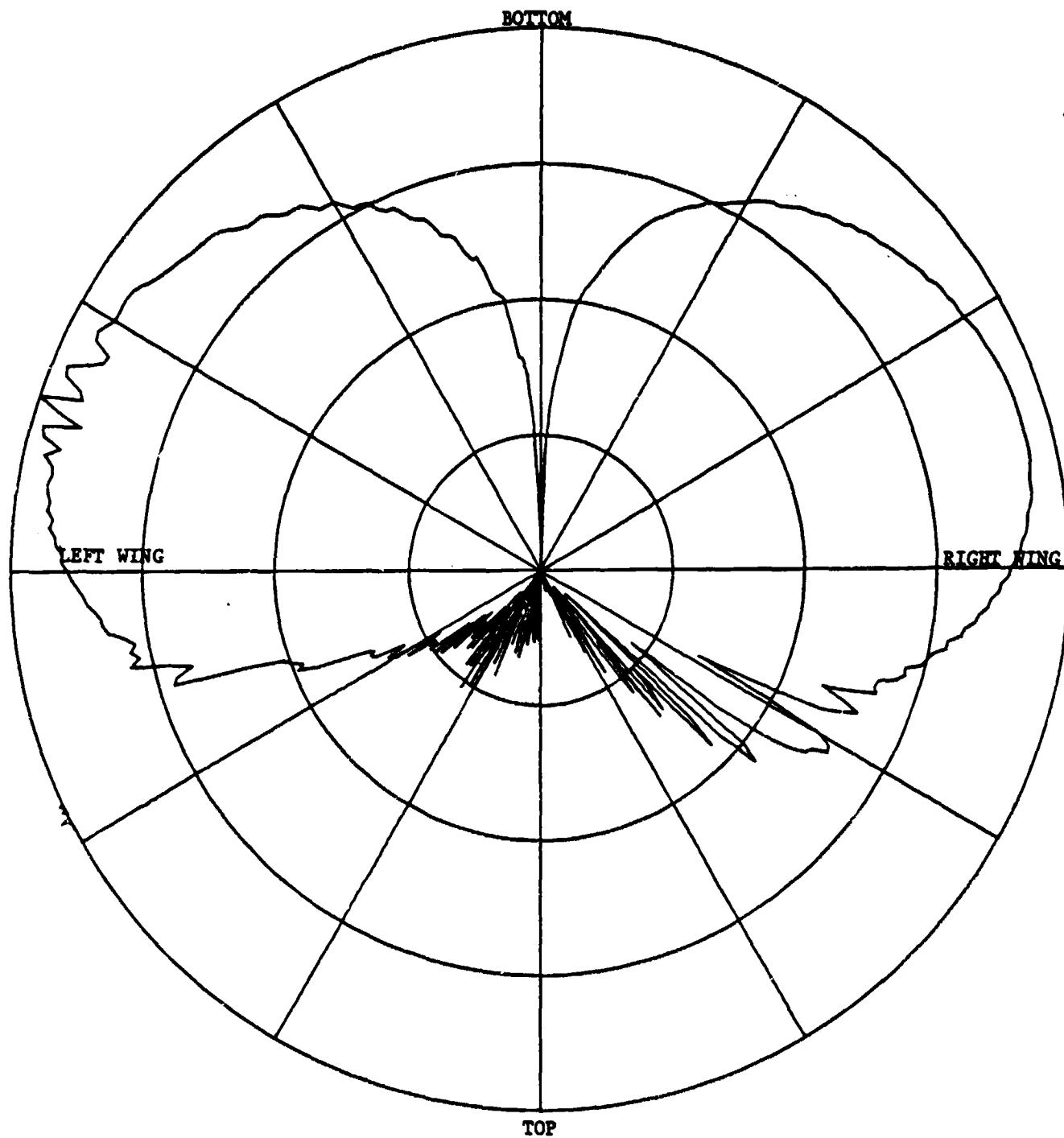


Figure II.15-3. deHavilland DHC-7. Roll plane pattern for antenna location 4.

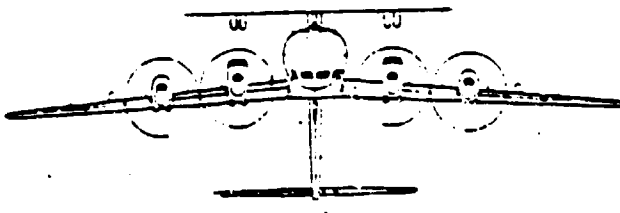
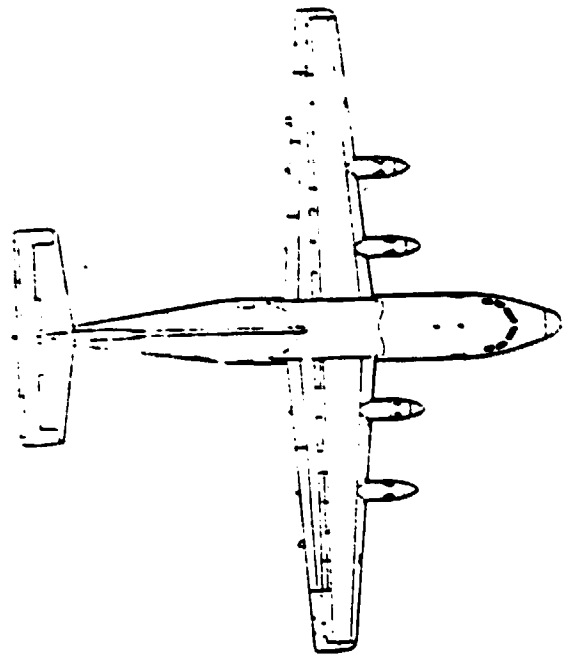
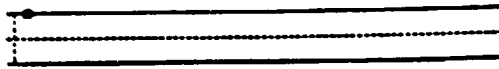
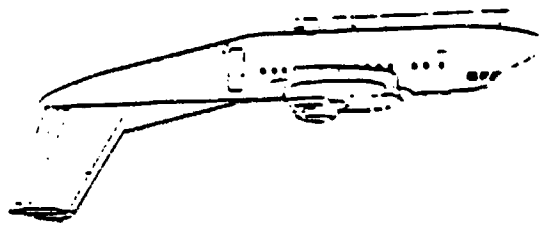
ORIGINAL PAGE IS  
OF POOR QUALITY

FG	
	42.3 48.4 42.3 48.4
	0. 0. 0.
SG	
	1
	0. 22.45
	0. 0. 0. .25 3
	1. 0.
PD	
	0. 0. 90.
	0 360 1
	50000. 5.2
PP	
	3.75 3
EX	

Figure II.16-1. deHavilland DHC-7. Data set for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

ORIGINAL PAGE IS  
OF POOR QUALITY



SEE  
DRAWING 10734  
TACTICAL PLANS

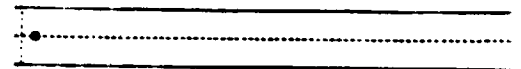


Figure II.16-2. deHavilland DHC-7. Bottom rear 1/4 wavelength monopole antenna for antenna location 5.

E-PHI  
DB PLOT

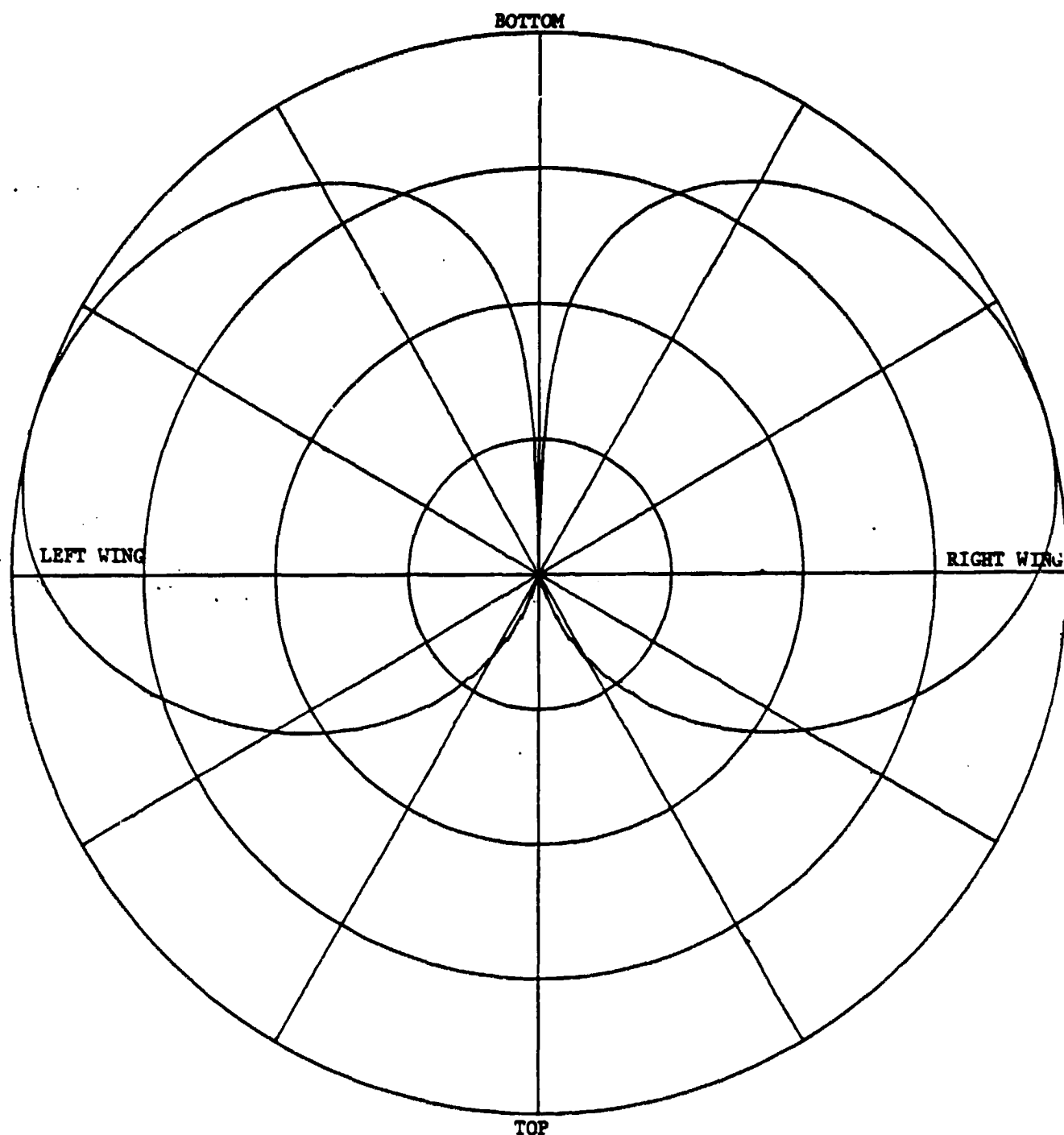


Figure II.16-3. deHavilland DHC-7. Roll plane pattern for antenna location 5.

### II.3. Rockwell Sabreliner 75A

Elevation and roll plane patterns are calculated for six particular antenna locations of this aircraft.

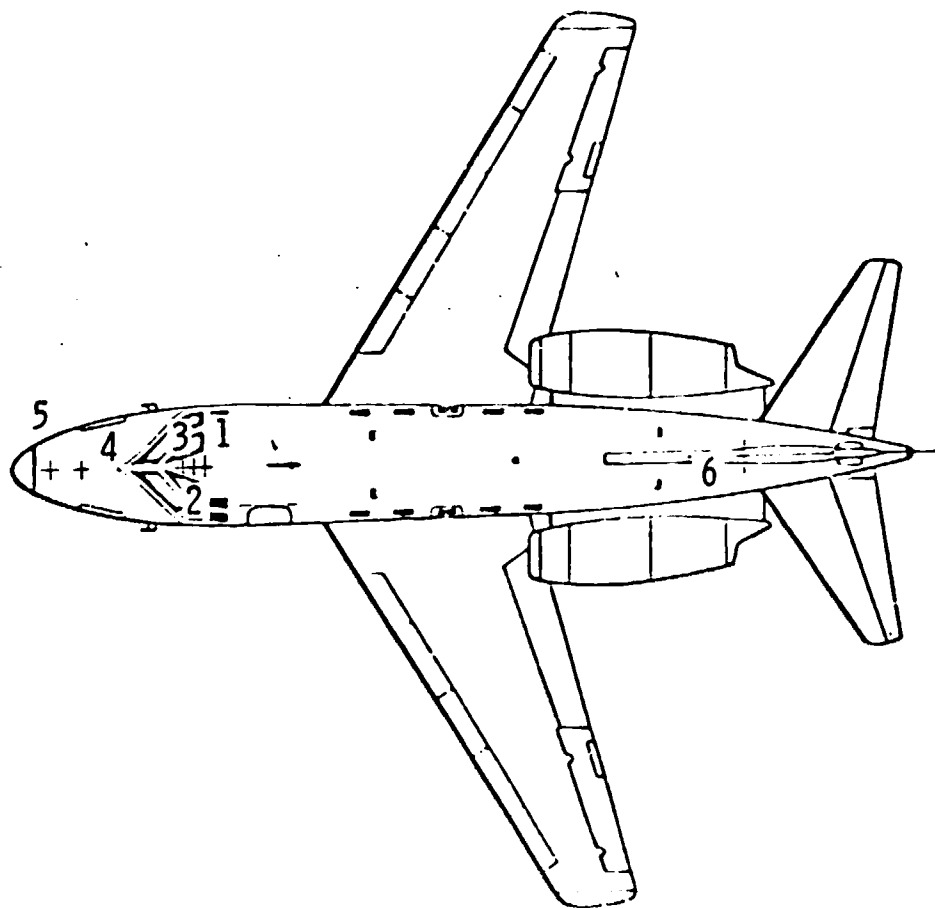
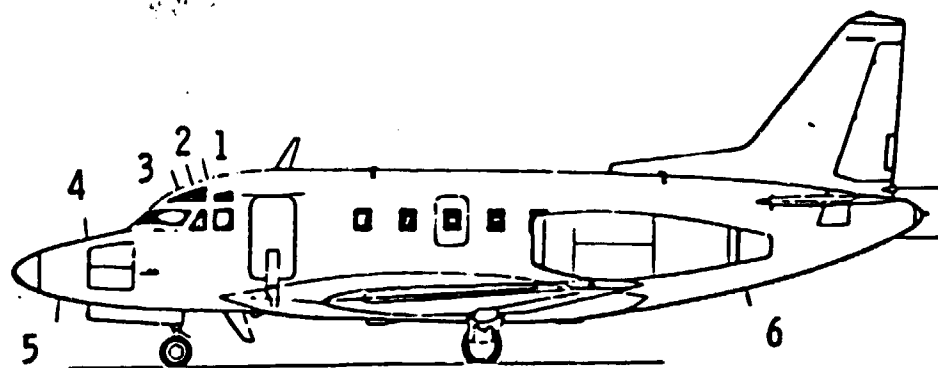


Figure II.17. Rockwell Sabreliner 75A. Antenna locations.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
33.73 70.88 58.12 402.75
0. 0. 0.
PG
4 T
3.83 67.408 -31.5
-10.724 131.752 -13.8
-10.724 131.752 13.8
3.83 67.408 31.5
PG
4 T
3.064 -389.894 8.22
114.134 -398.32 2.2
114.134 -366.914 0.
17.618 -284.952 0.
PG
4 T
17.618 -284.952 0.
114.134 -366.914 0.
114.134 -398.32 -2.2
3.064 -389.894 -8.22
SG
1
42.709 0.
0. 0. 0. .25 3
1. 0.
PD
0. 0. 89.9
0 360 1
50000. 5.2
PP
3.75 3
EX

```

Figure II.18-1. Rockwell Sabreliner 75A. Data set for antenna location 1.



ORIGINAL PAGE IS  
OF POOR QUALITY

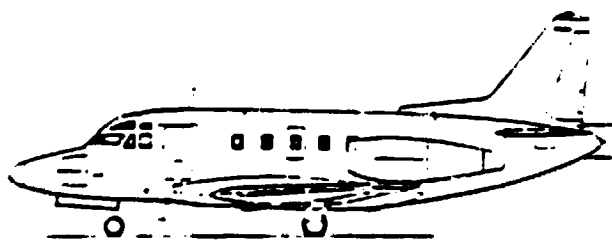


FIGURE II.18-2  
ELEVATION PLANE

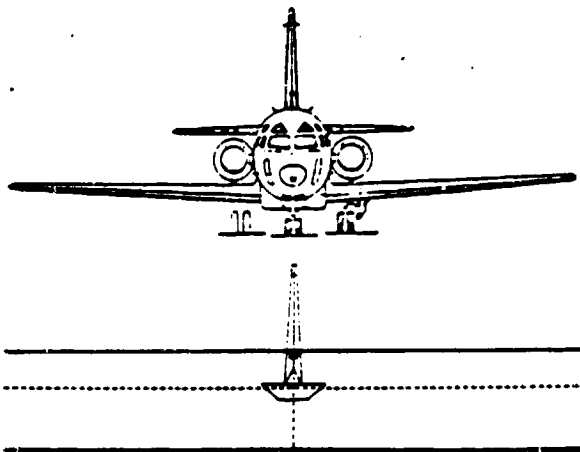
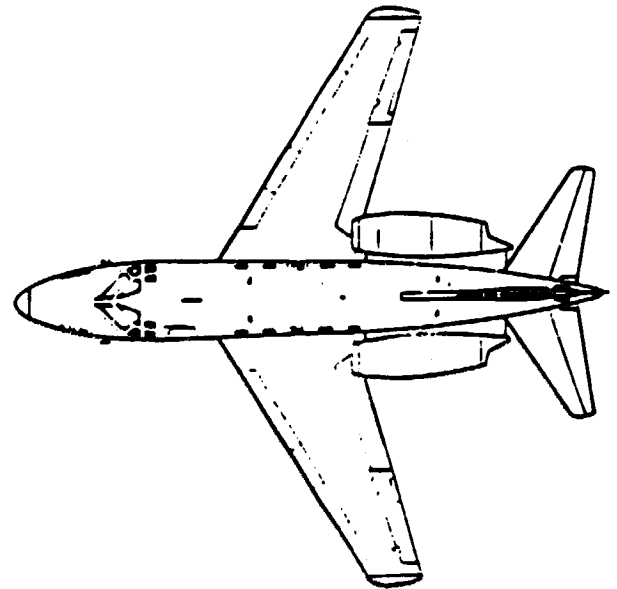
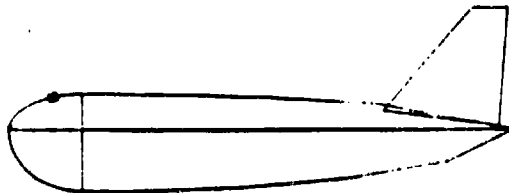


FIGURE II.18-2  
ELEVATION PLANE

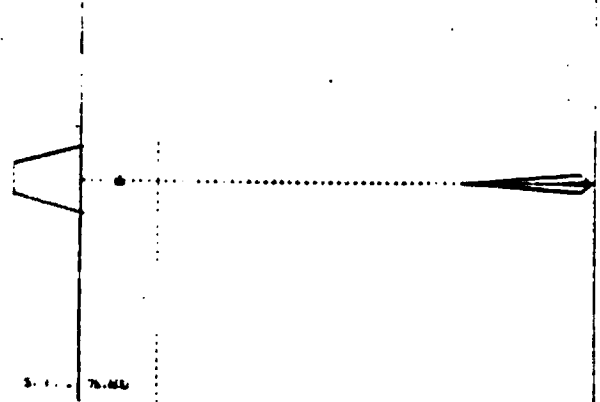


Figure II.18-2. Rockwell Sabreliner 75A. Top front 1/4 wavelength  
monopole antenna above cockpit for antenna location 1.

E-PHI  
DB PLOT

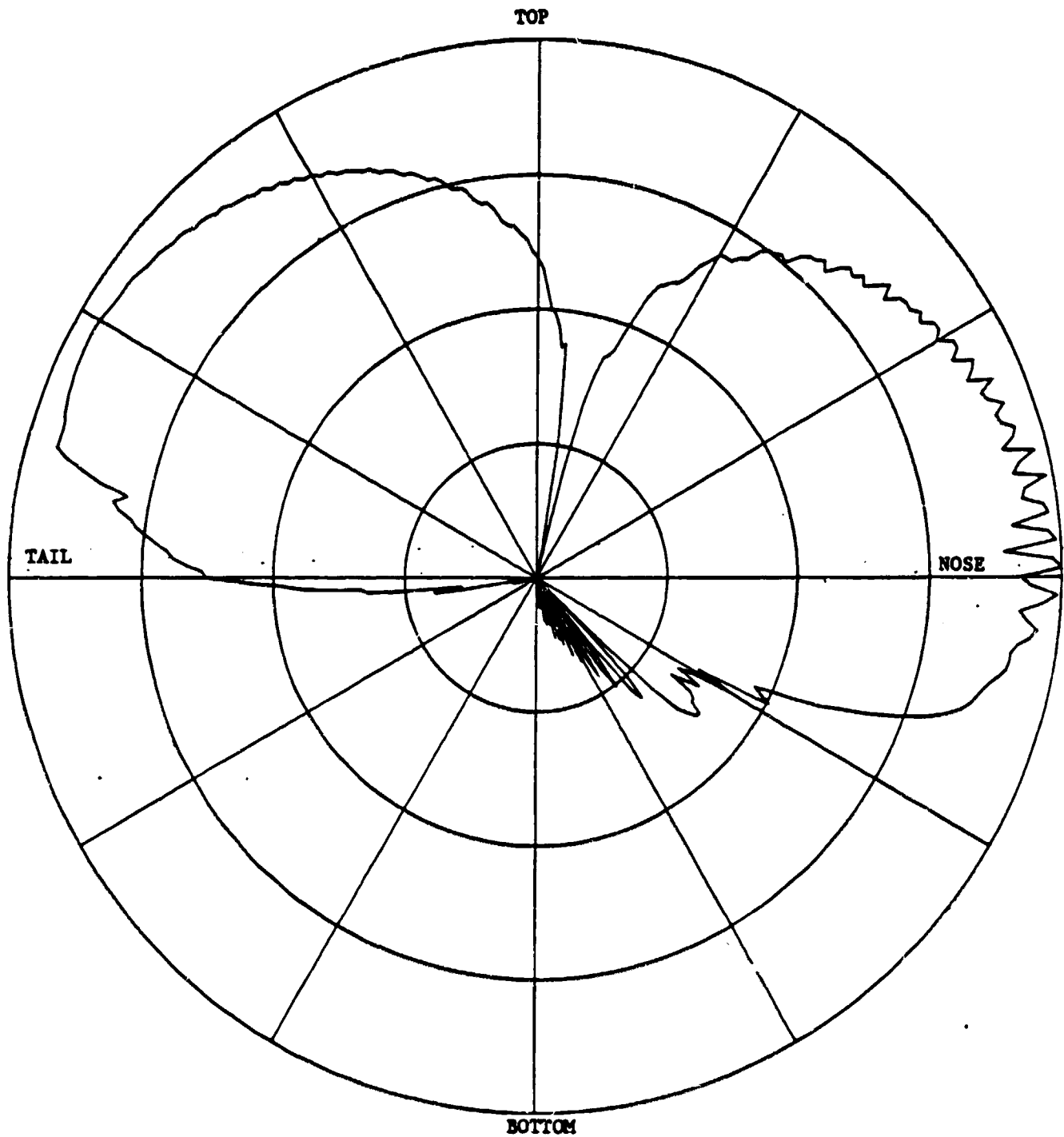


Figure II.18-3. Rockwell Sabreliner 75A. Elevation plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	33.73	70.88	98.12	402.75
	0.	0.	0.	
PG	4	T		
	3.83	67.408	-31.5	
	-10.724	131.752	-13.8	
	-10.724	131.752	13.8	
	3.83	67.408	31.5	
PG	4	T		
	3.064	-389.894	8.22	
	114.134	-398.32	2.2	
	114.134	-366.914	0.	
	17.618	-284.952	0.	
PG	4	T		
	17.618	-284.952	0.	
	114.134	-366.914	0.	
	114.134	-398.32	-2.2	
	3.064	-389.894	-8.22	
SG	1			
	51.188	0.		
	0.	0.	0.	.25 3
	1.	0.		
PD	0.	0.	89.9	
	0	360	1	
	50000.	5.2		
PP	3.75	3		
EX				

Figura II.19-1. Rockwell Sabreliner 75A. Data set for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

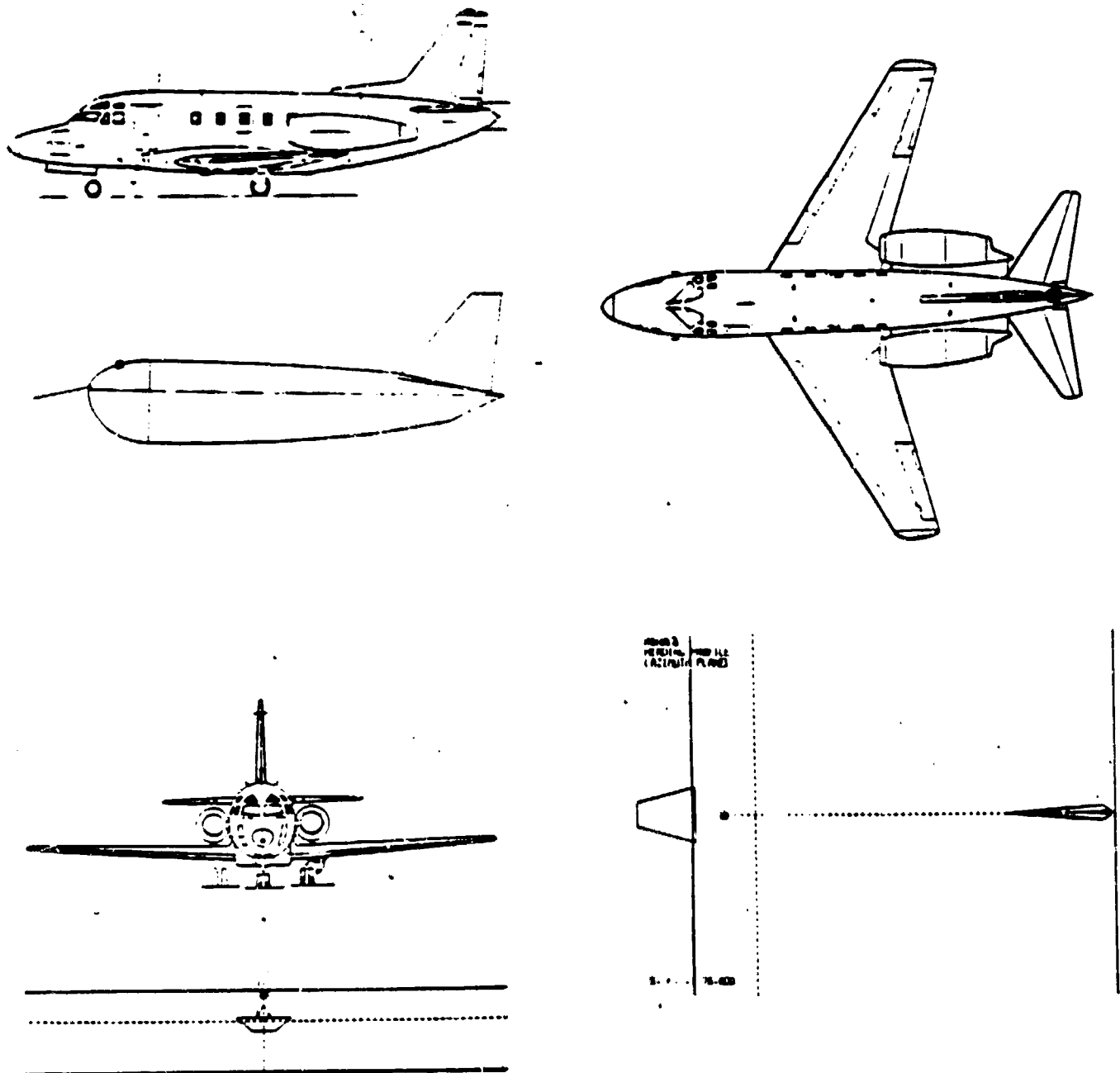


Figure II.19-2. Rockwell Sabreliner 75A. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

E-PHI  
DB PLOT

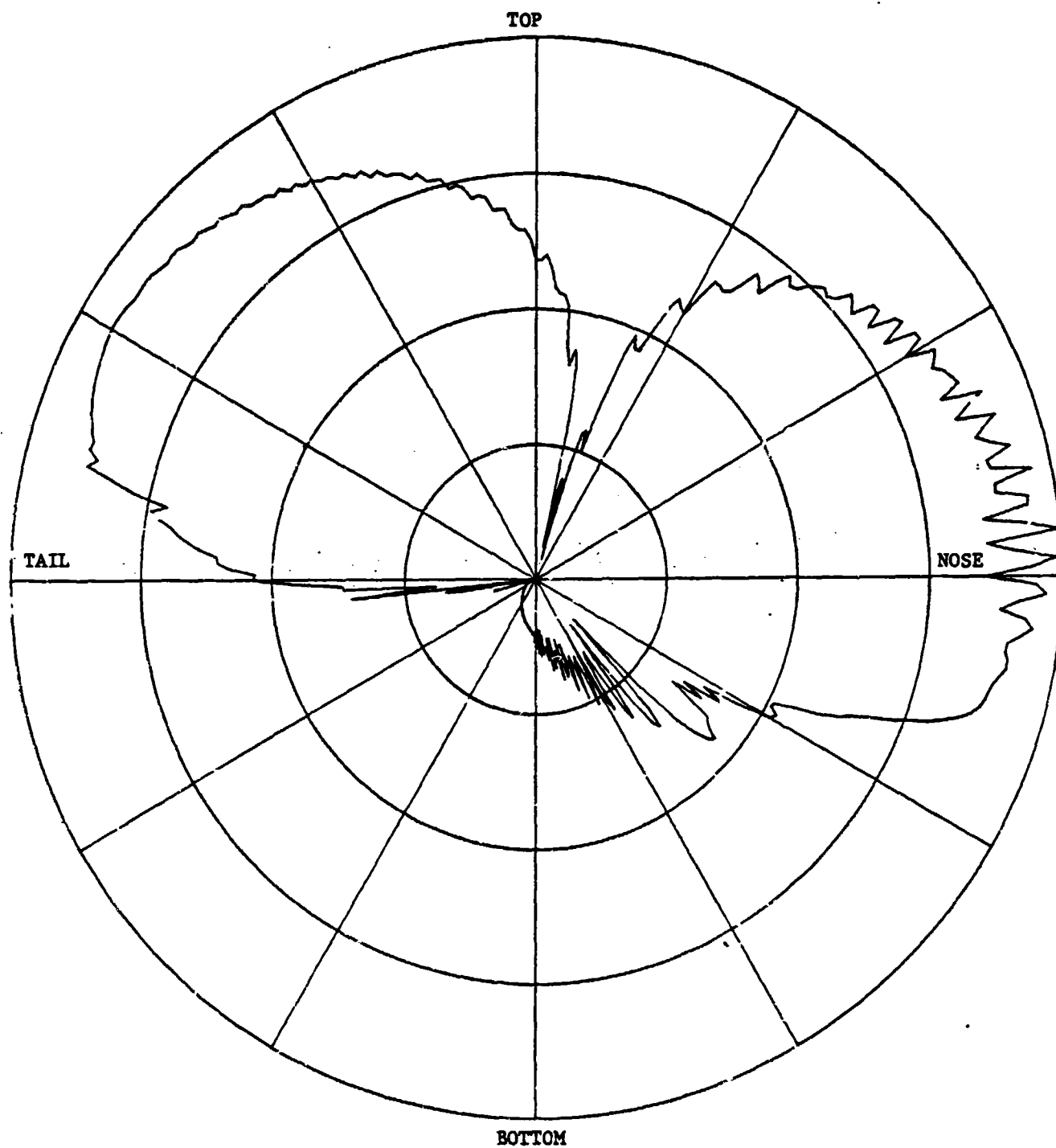


Figure II.19-3. Rockwell Sabreliner 75A. Elevation plane pattern for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
33.73 70.88 58.12 402.75  
0. 0. 0.  
PG  
4 T  
3.83 67.408 -31.5  
-10.724 131.752 -13.8  
-10.724 131.752 13.8  
3.83 67.408 31.5  
PG  
4 T  
3.064 -389.894 8.22  
114.134 -398.32 2.2  
114.134 -366.914 0.  
17.618 -284.952 0.  
PG  
4 T  
17.618 -284.952 0.  
114.134 -366.914 0.  
114.134 -398.32 -2.2  
3.064 -389.894 -8.22  
SG  
I  
61.927 0.  
0. 0. 0. .25 3  
I. 0.  
PD  
0. 0. 89.9  
0 360 I  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.20-1. Rockwell Sabreliner 75A. Data set for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

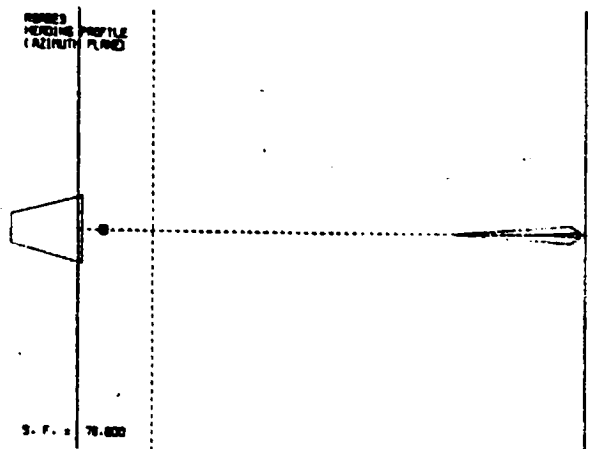
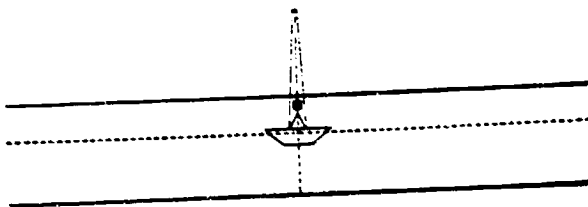
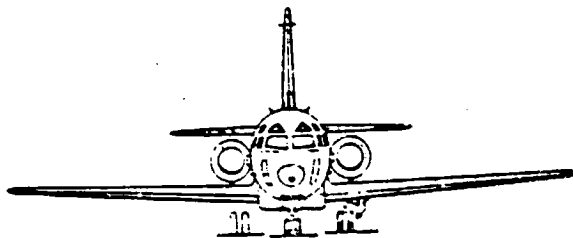
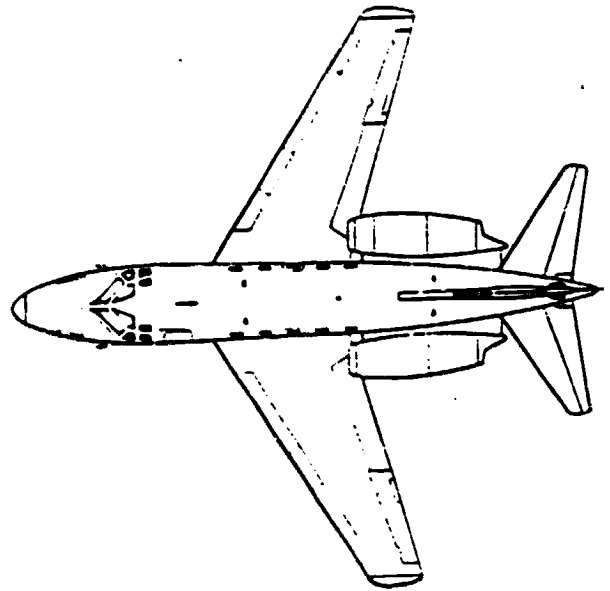
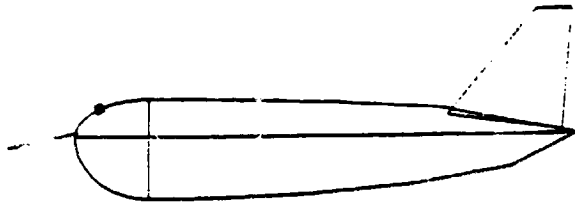
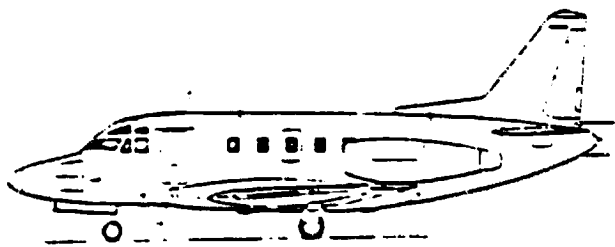


Figure II.20-2. Rockwell Sabreliner 75A. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 3.

E-PHI  
DB PLOT

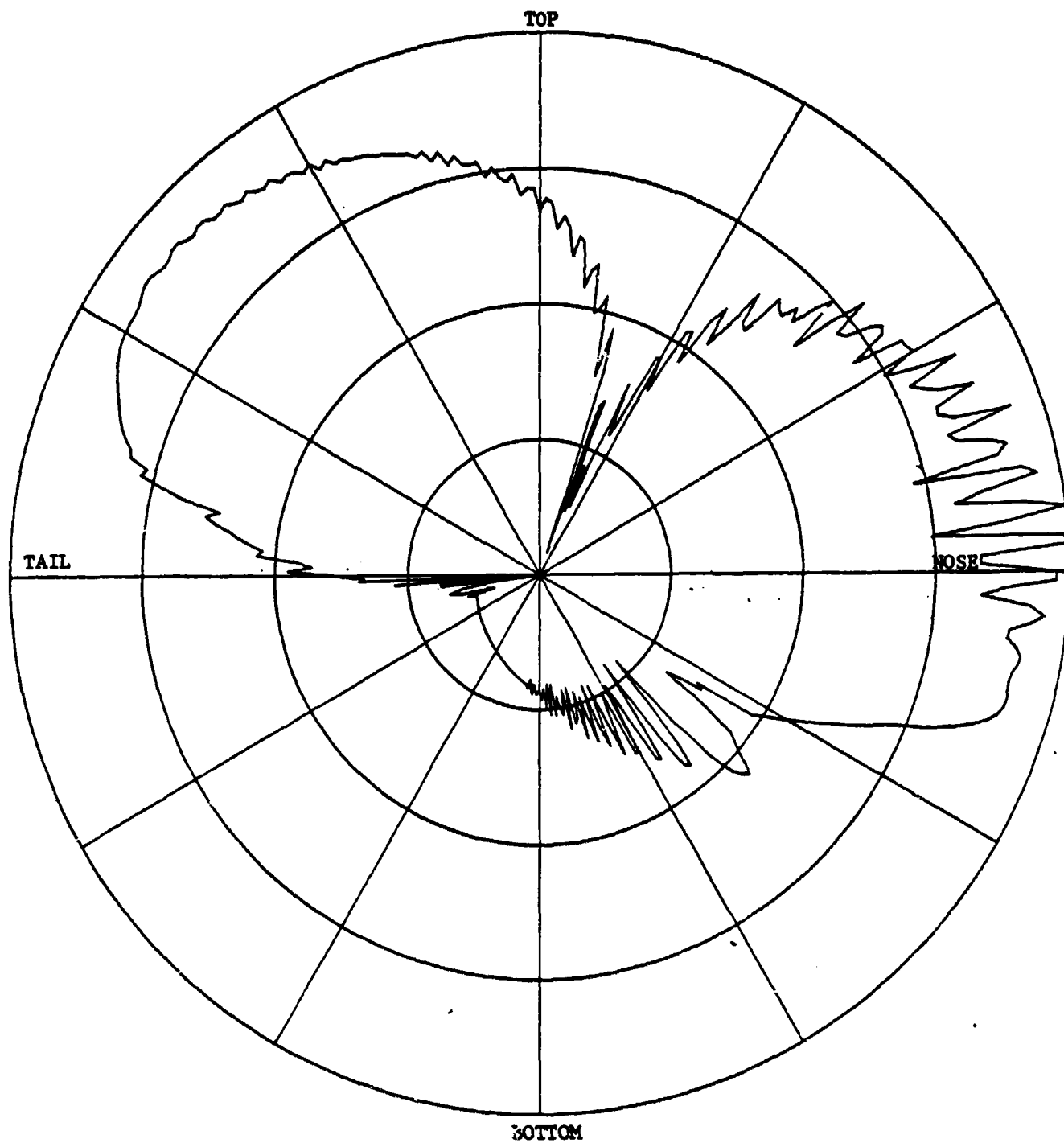


Figure II.20-3. Rockwell Sabreliner 75A. Elevation plane pattern for antenna location 3.



ORIGINAL PAGE IS  
OF POOR QUALITY

FG	27.128	212.132	29.379	370.932
	0.	0.	0.	
PG				
4 E				
	-9.958	196.096	-13.	
	10.724	196.096	-13.	
	10.724	196.096	13.	
	-9.958	196.096	13.	
PG				
4 T				
	16.852	114.134	29.	
	45.196	114.134	-25.	
	16.852	149.37	-29.	
PG				
4 T				
	12.256	-324.784	8.865	
	134.05	-334.742	2.2	
	134.05	-303.336	0.	
	22.214	-206.82	0.	
PG				
4 T				
	22.214	-206.82	0.	
	134.05	-303.336	0.	
	134.05	-334.742	-2.2	
	12.256	-324.784	-8.865	
SG				
1				
	84.497	0.		
	0.	0.	0.	25 3
	1.	0.		
PD				
	0.	0.	89.9	
	0.	360	1	
	50000.	1.2		
PP				
	3.75	3		
EX				

Figure II.21-1. Rockwell Sabreliner 75A. Data set for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

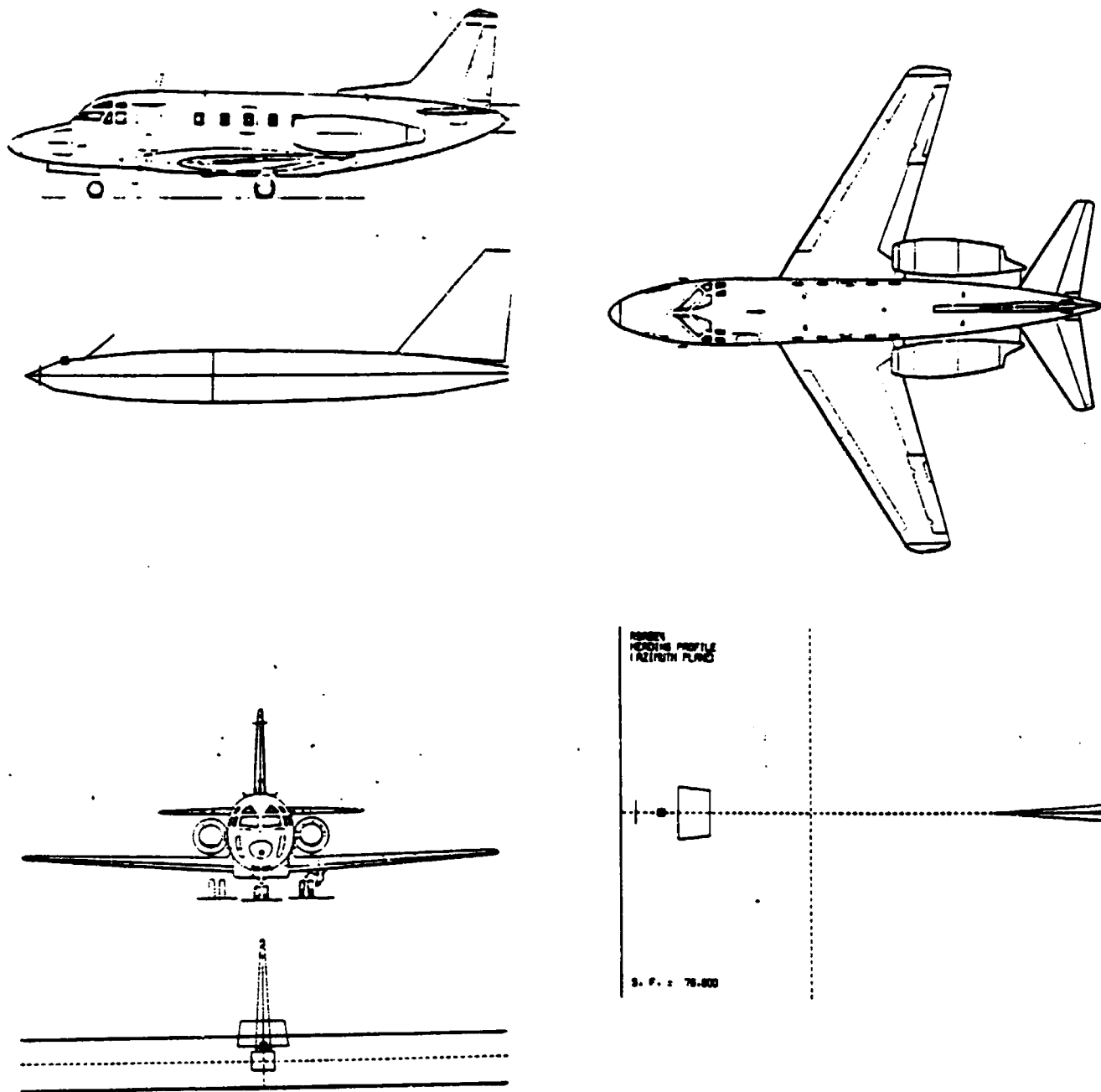


Figure II.21-2. Rockwell Sabreliner 75A. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 4.

E-PHI  
DB PLOT

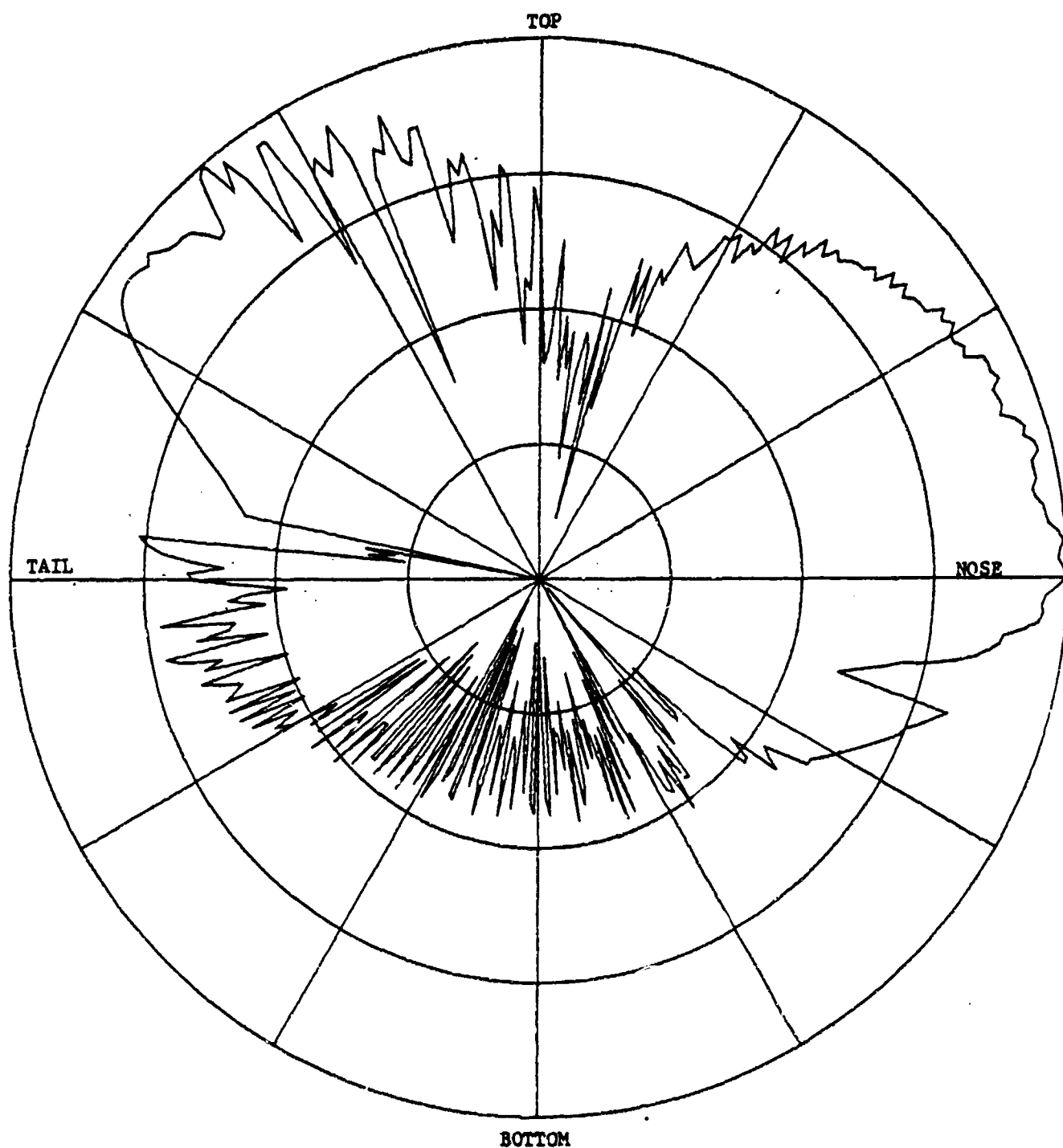


Figure II.21-3. Rockwell Sabreliner 75A. Elevation plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG				
	29.38	370.93	27.13	212.13
	0.	0.	0.	
PG				
	4	T		
	22.98	-108.772	-4.5	
	49.79	-108.772	-4.5	
	49.79	-108.772	4.5	
	22.98	-108.772	4.5	
PG				
	4	F		
	-11.49	-192.266	12.	
	9.958	-192.266	12.	
	9.958	-192.266	-12.	
	-11.49	-192.266	-12.	
SG				
	1			
	-85.60	0.		
	0.	0.	0.	.25 3
	1.	0.		
PD				
	0.	0.	89.9	
	360	1		
	50000.	5.2		
PP				
	3.75	3		
FX				

Figure II.22-1. Rockwell Sabreliner 75A. Data set for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

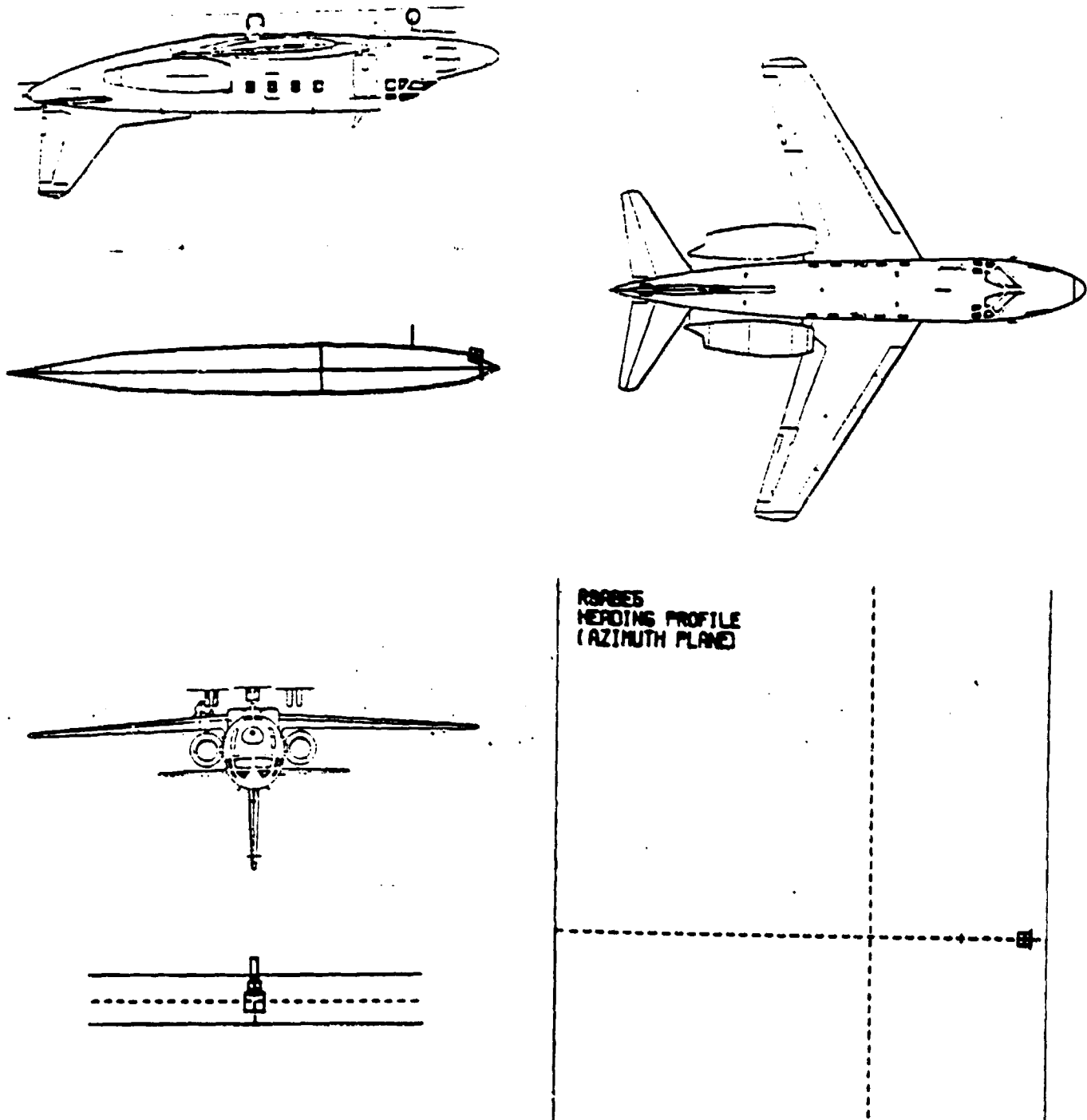


Figure II.22-2. Rockwell Sabreliner 75A. Bottom front  $1/4$  wavelength monopole antenna for antenna location 5.

E-PHI  
DB PLOT

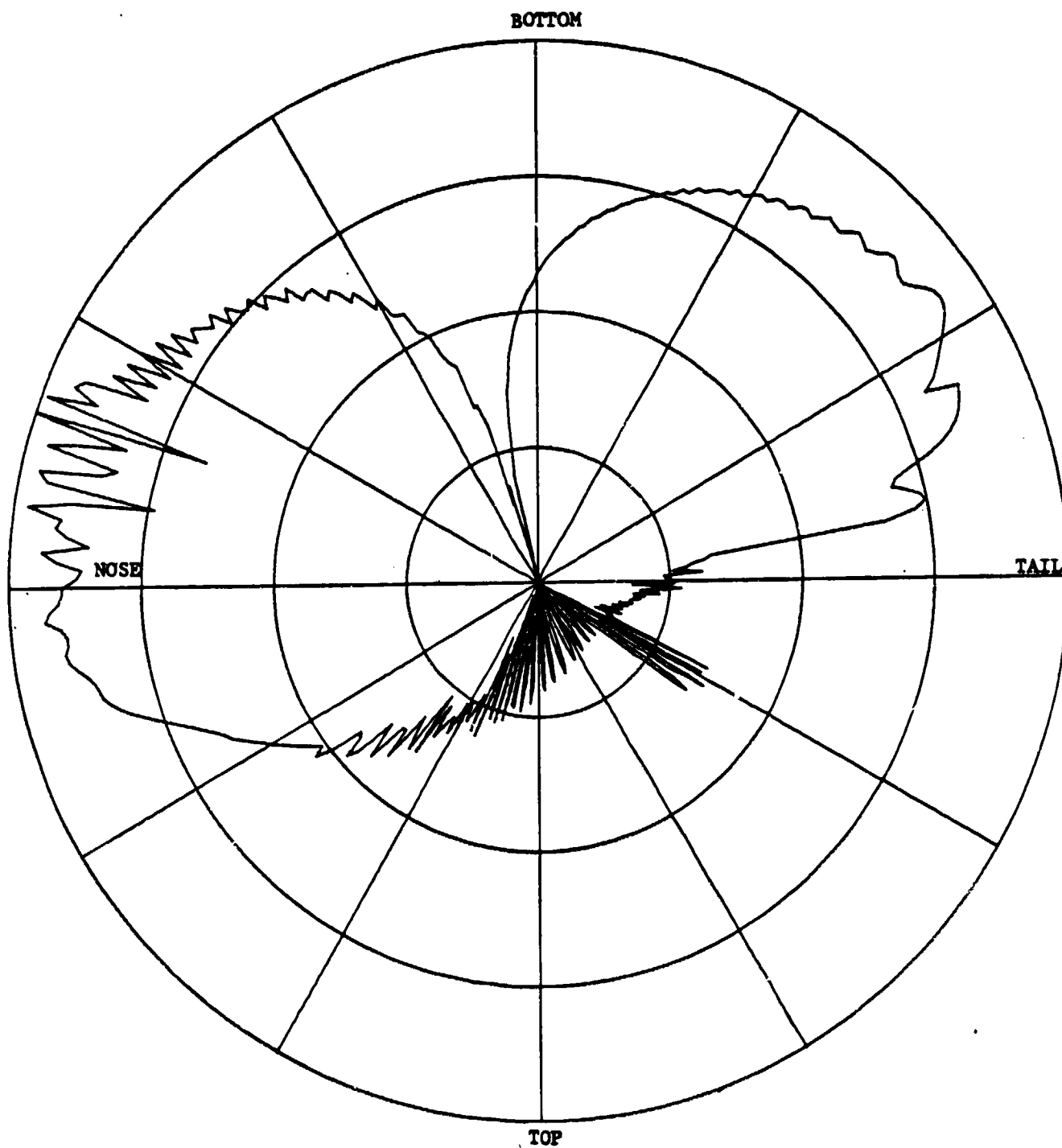


Figure II.22-3. Rockwell Sabreliner 75A. Elevation plane pattern for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	
	48.185 219.422 31.611 331.523
	0. 0. 0.
SG	
	1
	71.787 0.
	0. 0. 0. .25 3
	1. 0.
PO	
	0. 0. 89.9
	0 360 1
	50000. 5.2
PP	
	3.75 3
EX	

Figure II.23-1. Rockwell Sabreliner 75A. Data set for  
antenna location 6.

ORIGINAL PAGE 15  
OF PCOR QUALITY

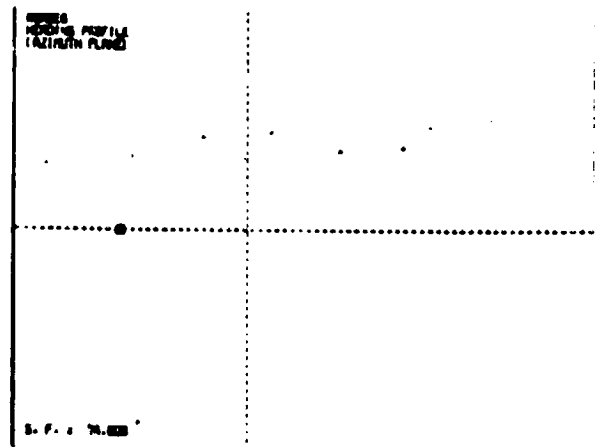
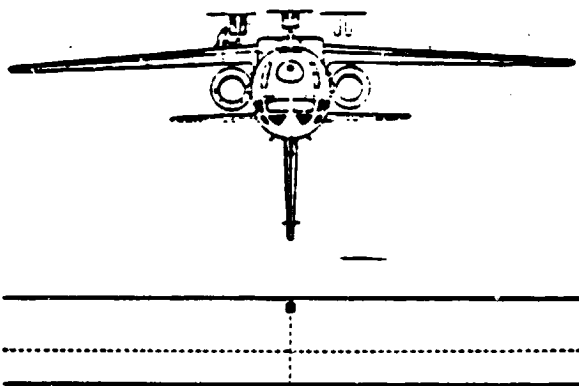
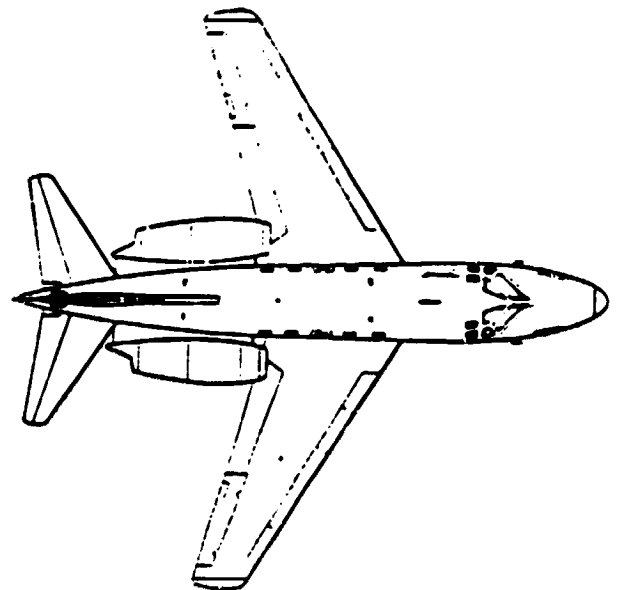
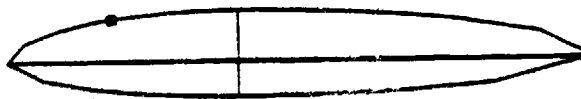
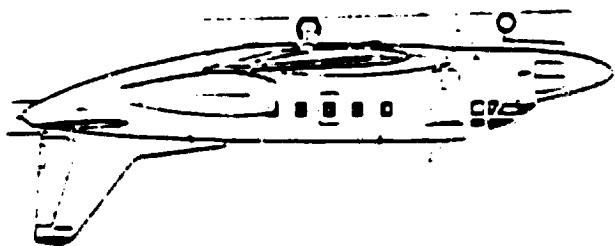


Figure II.23-2. Rockwell Sabreliner 75A. Bottom rear 1/4 wavelength monopole antenna for antenna location 6.



E-PHI  
DB PLOT

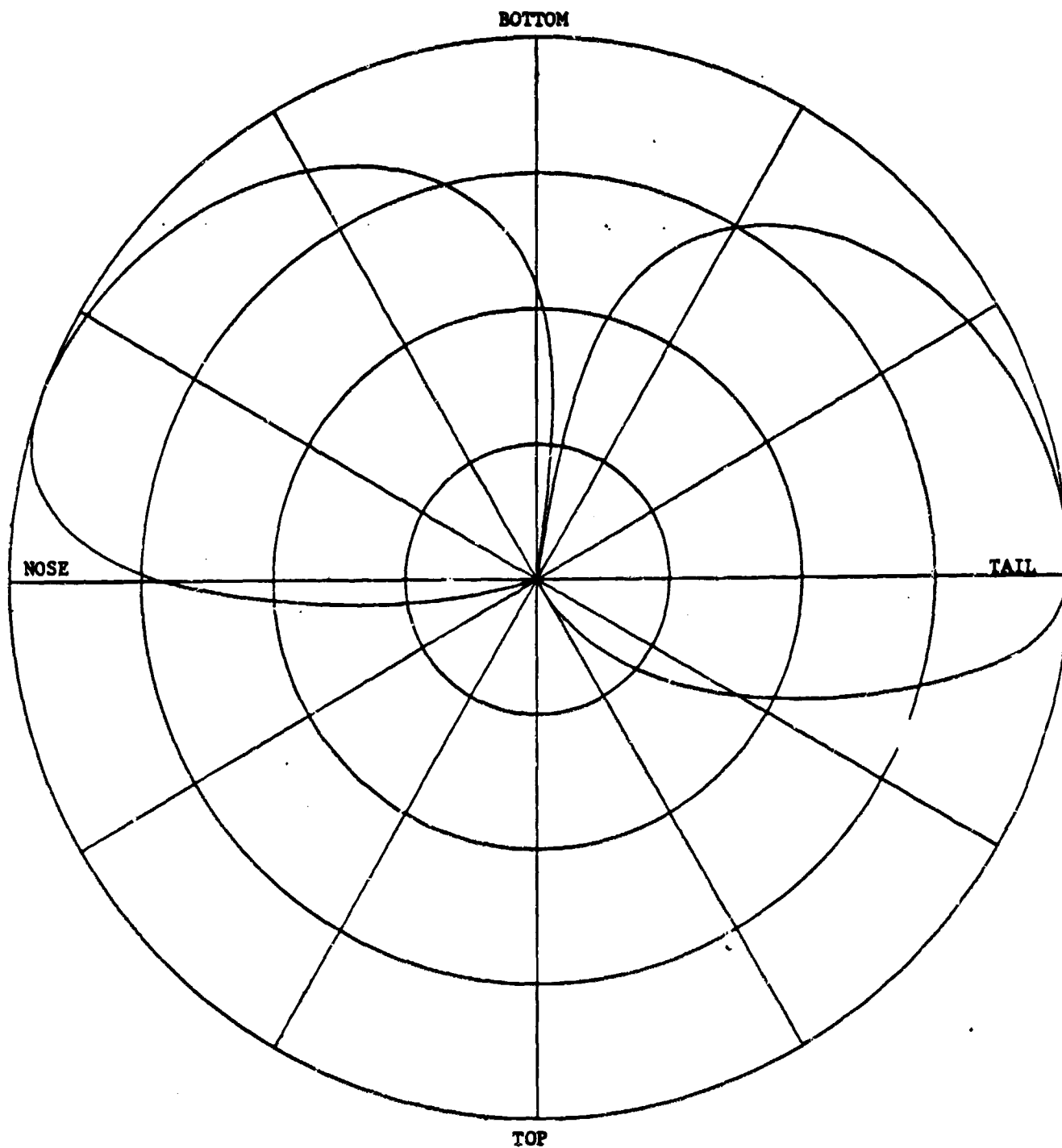


Figure II.23-3. Rockwell Sabreliner 75A. Elevation plane pattern for antenna location 6.

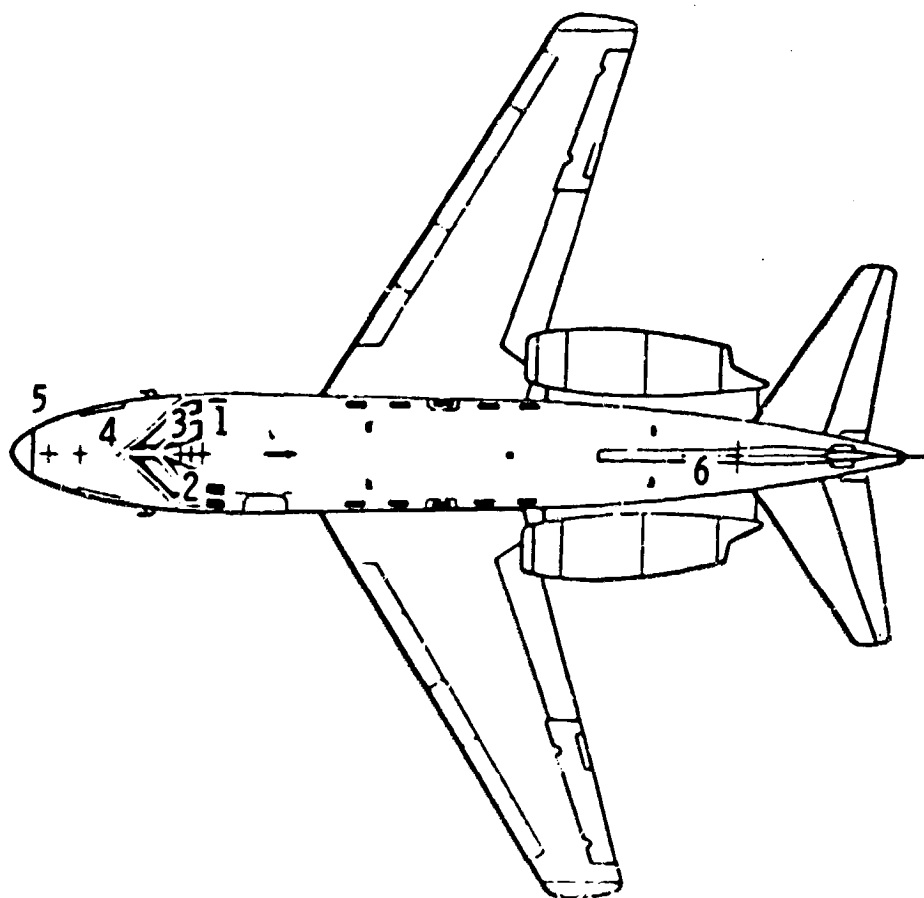
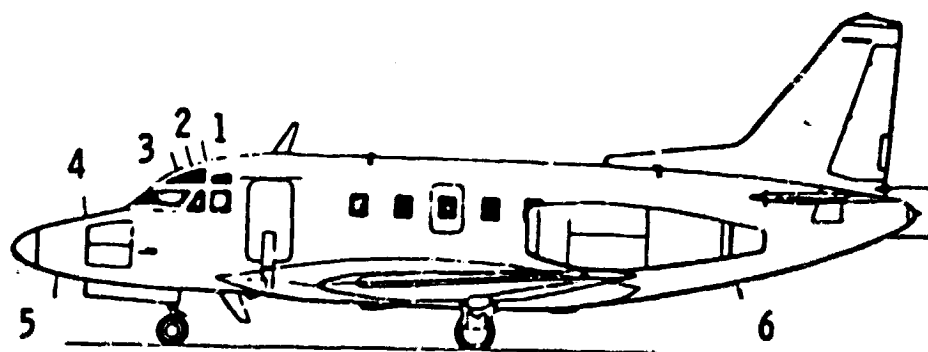
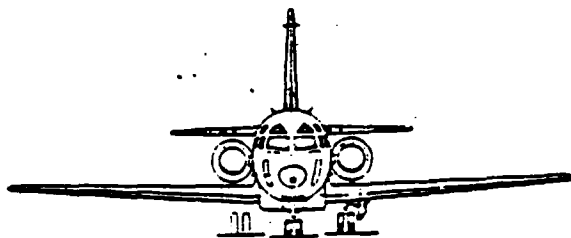
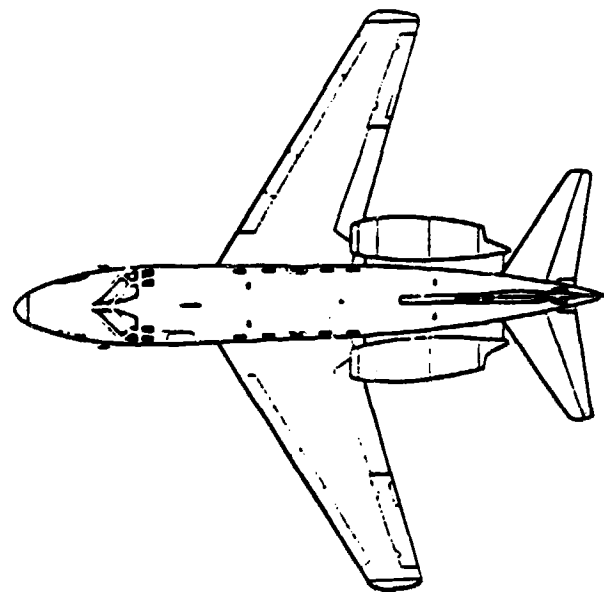
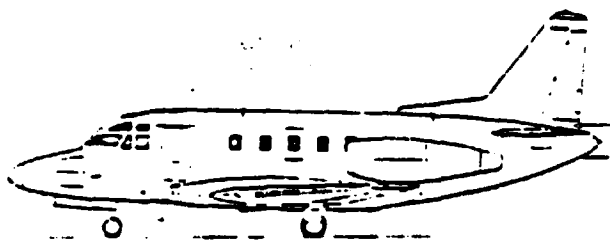


Figure II.24. Rockwell Sabreliner 75A. Antenna locations.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	
	39, 34, 39, 34,
	0, 0, 0,
SG	
	1
	0, 39, 6
	0, 0, 0, .25 3
	1, 0,
PN	
	0, 0, 90,
	0 360 1
	50000, 5.2
PP	
	3.75 3
FX	

Figure II.25-1. Rockwell Sabreliner 75A. Data set for  
antenna location 1.



ANTENNA  
LOCATION  
FAIRLY PLACED

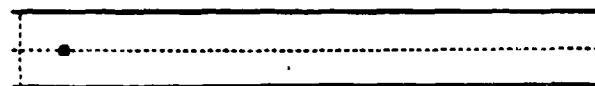


Figure II.25-2. Rockwell Sabreliner 75A. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 1.

E-PHI  
DB PLOT

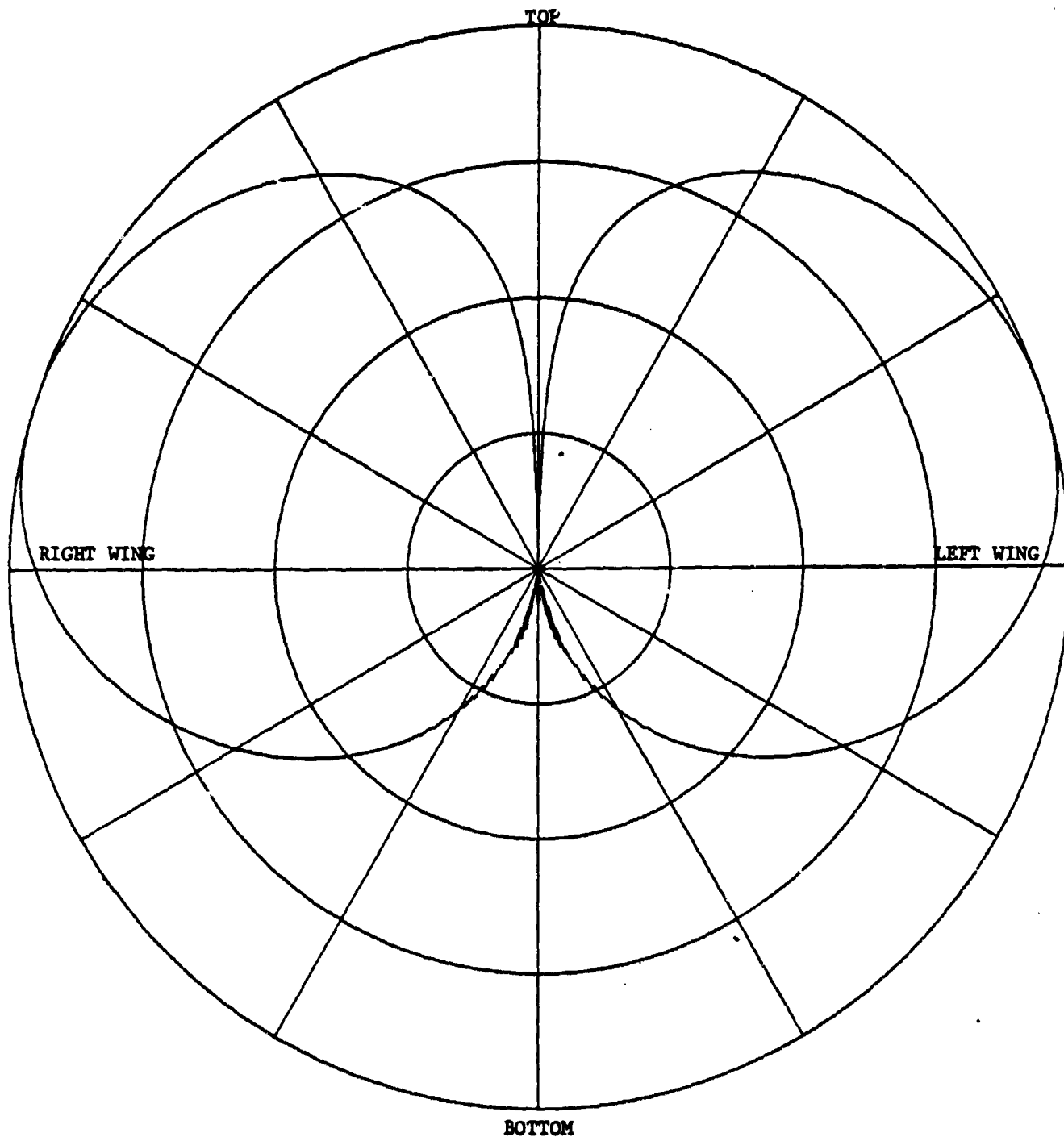
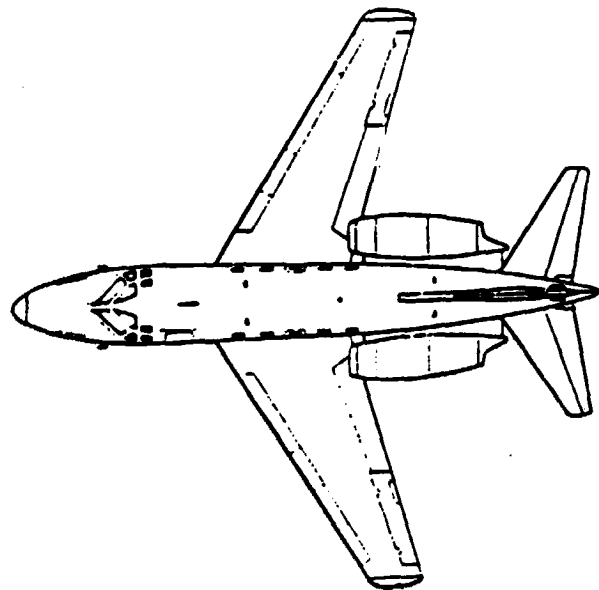
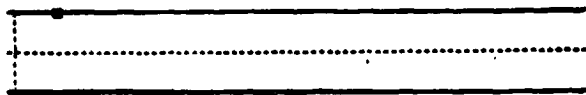
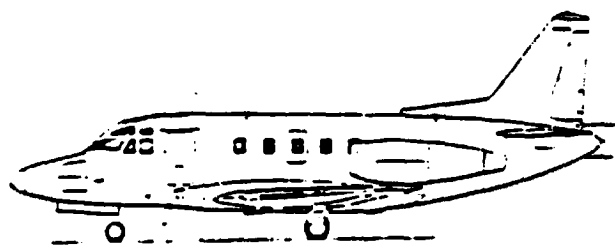


Figure II.25-3. Rockwell Sabreliner 75A. Roll plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	
	37. 34. 37. 34.
	0. 0. 0.
SG	
	1
	0. 39.6
	0. 0. 0. .25 3
	1. 0.
PD	
	0. 0. 90.
	0 360 1
	50000. 5.2
PP	
	3.75 3
EX	

Figure II.26-1. Rockwell Sabreliner 75A. Data set for antenna location 2.



ROCKWELL  
SABRELINER 75A  
(AZIMUTH PLANE)

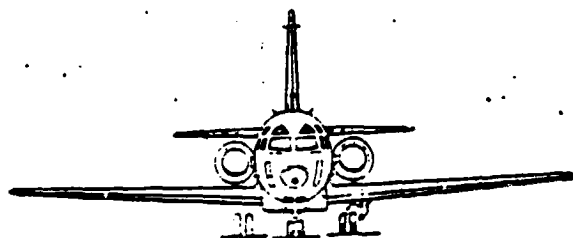


Figure II.26-2. Rockwell Sabreliner 75A. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

E-PHI  
DB PLOT

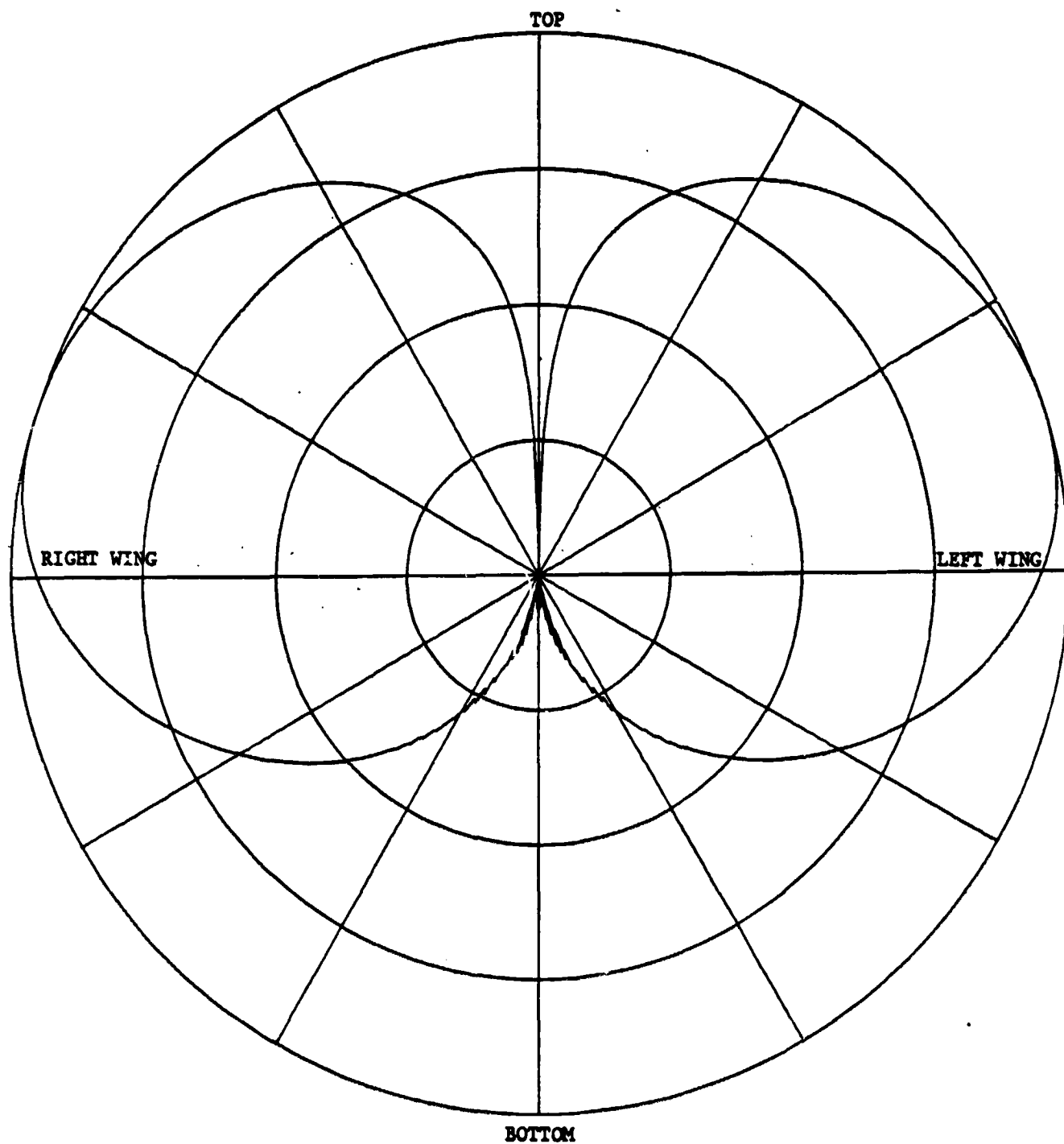


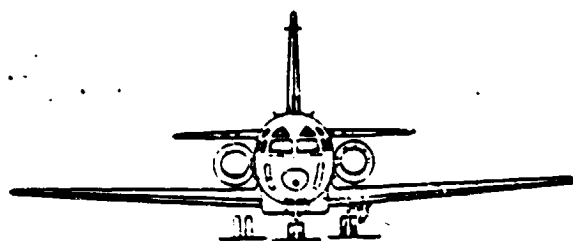
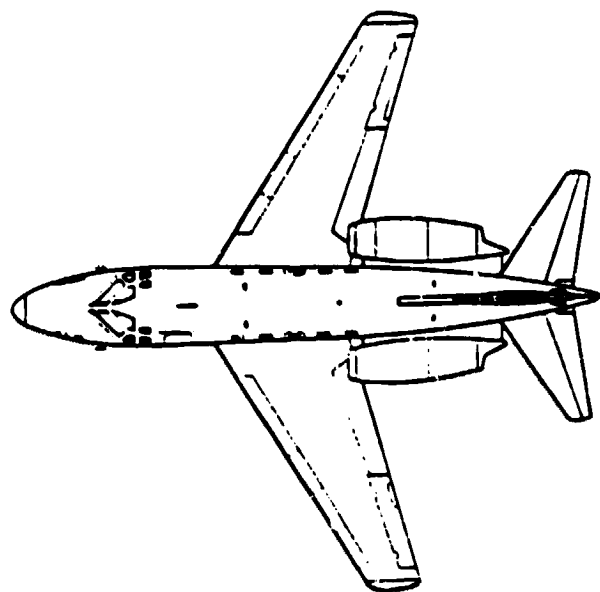
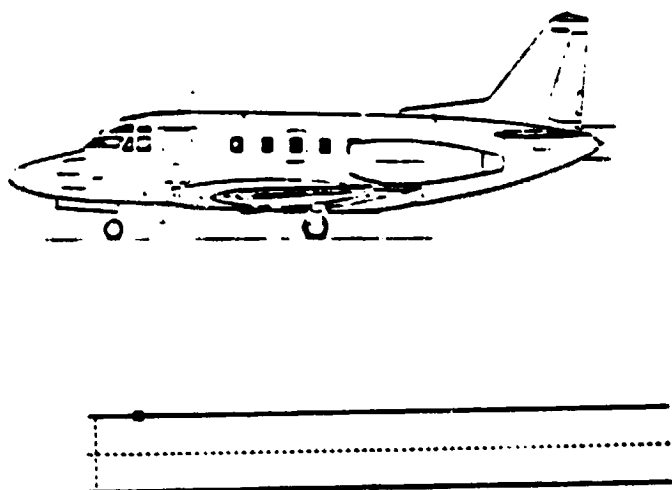
Figure II.26-3. Rockwell Sabreliner 75A. Roll plane pattern for antenna location 2.



ORIGINAL PAGE IS  
OF POOR QUALITY

FG	
	35, 34, 35, 34,
	0, 0, 0.
SG	
	1
	0, 39.6
	0, 0, 0, .25 3
	1, 0.
PD	
	0, 0, 90.
	0 360 1
	50000, 5, 2
PP	
	3.75 3
EX	

Figure II.27-1. Rockwell Sabreliner 75A. Data set for antenna location 3.



ANTENNA  
RADIATION PATTERN  
(AZIMUTH PLANE)

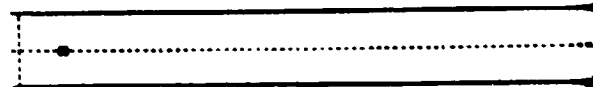


Figure II.27-2. Rockwell Sabreliner 75A. Top front  $1/4$  wavelength monopole antenna above cockpit for antenna location 3.

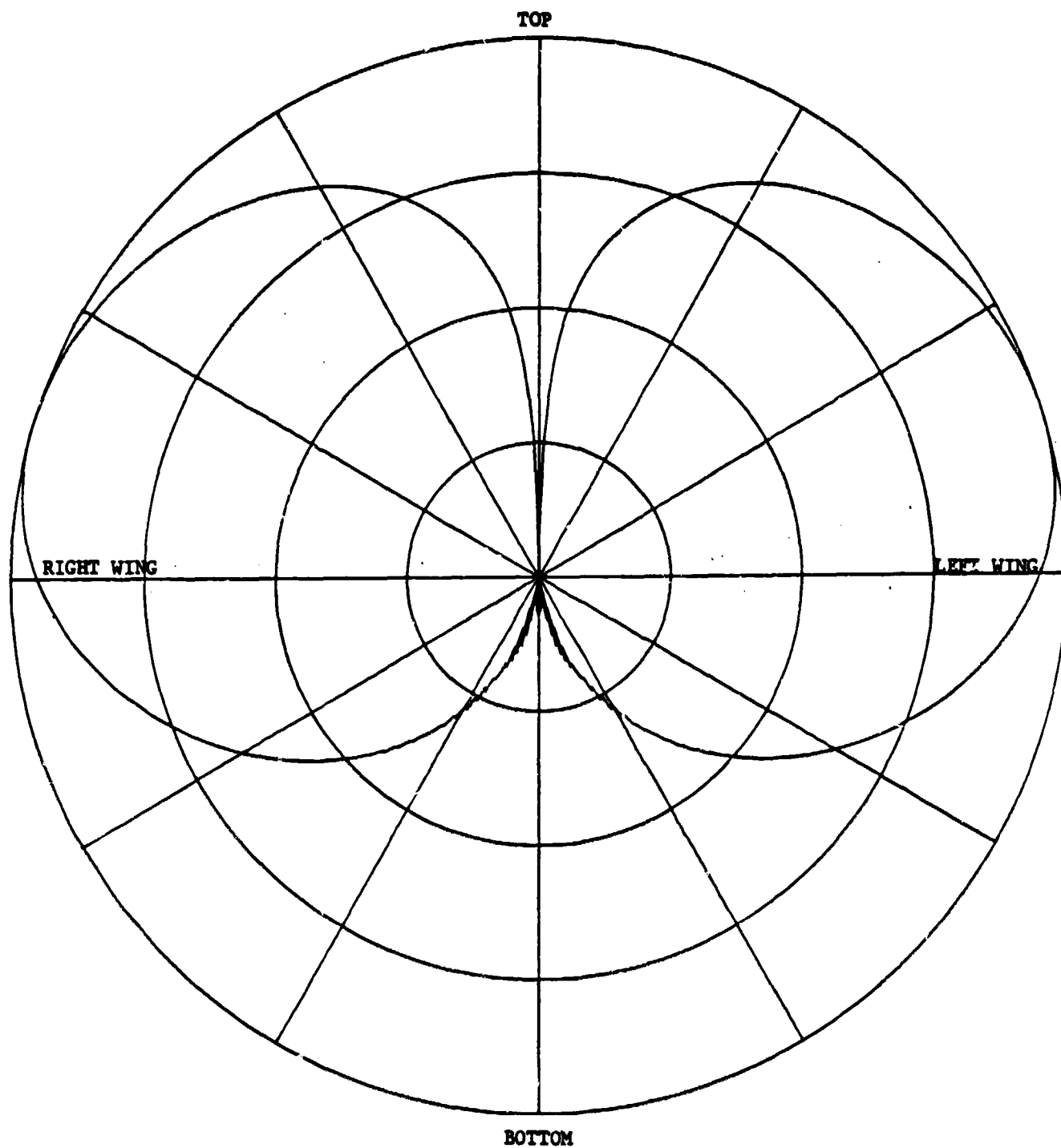


Figure II.27-3. Rockwell Sabreliner 75A. Roll plane pattern for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	18. 23. 18. 23.
	0. 0. 0.
SG	1
	C. 117.198
	0. 0. 0. .25 3
	1. 0.
PD	0. 0. 90.
	0 360 1
	50000. 5.2
PP	3.75 3
EX	

Figure II.28-1. Rockwell Sabreliner 75A. Data set for antenna location 4.

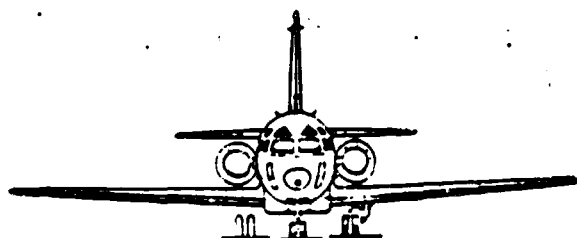
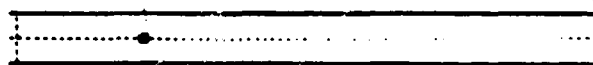
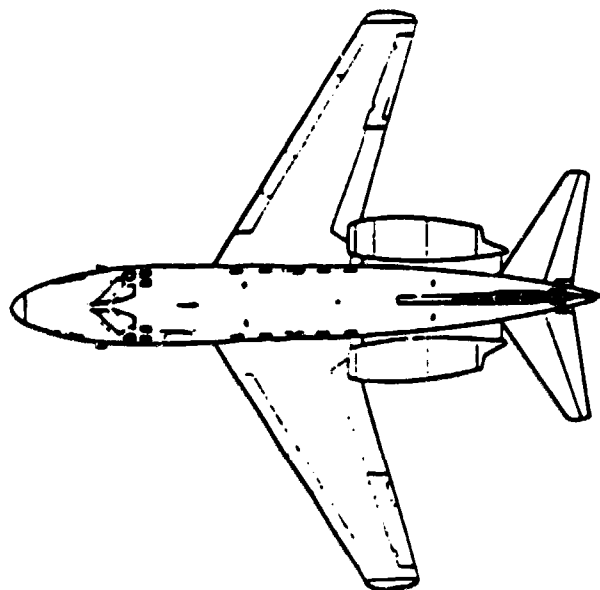
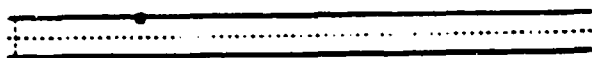
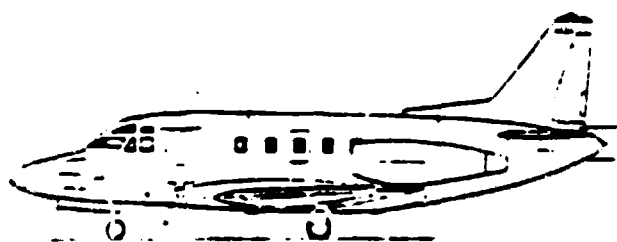


Figure II.28-2. Rockwell Sabreliner 75A. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 4.

E-PHI  
DB PLOT

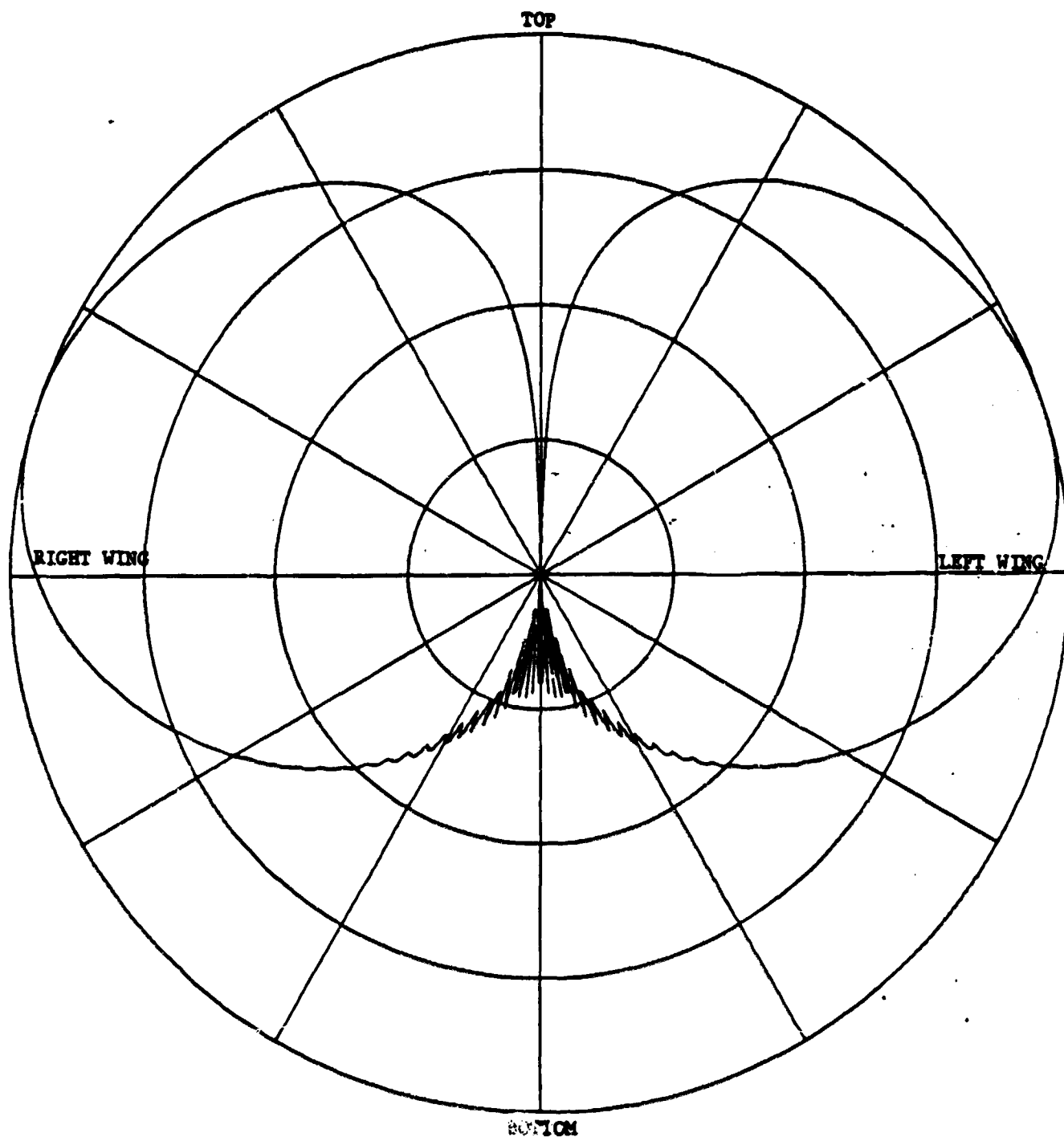
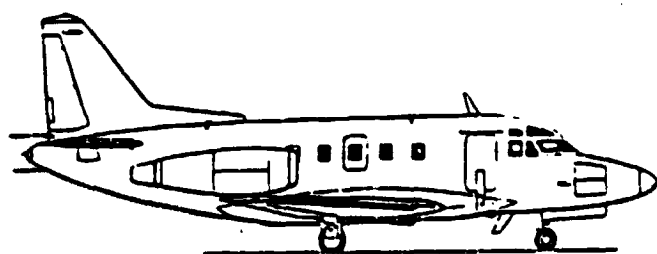


Figure II.28-3. Rockwell Sabreliner 75A. Roll plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	
	15. 18. 15. 18.
	0. 0. 0.
SG	
	1
	0. 117.198
	0. 0. 0. .25 3
	1. 0.
PD	
	0. 0. 90.
	0 360 1
	50000. 5.2
PP	
	3.75 3
EX	

Figure II.29-1. Rockwell Sabreliner 75A. Data set for  
antenna location 5.



ROCKWELL  
SABRELINER PROFILE  
(ELEVATION PLANE)

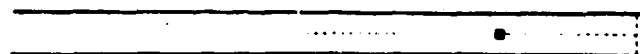
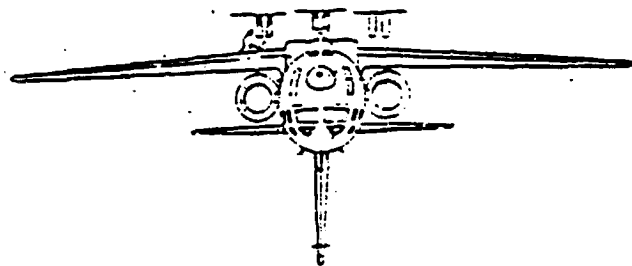
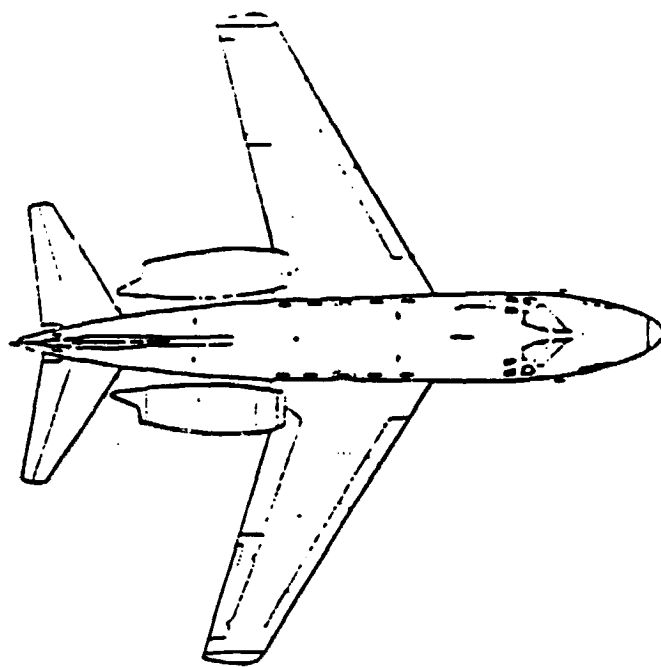
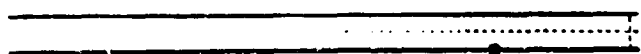


Figure II.29-2. Rockwell Sabreliner 75A. Bottom front  $1/4$  wavelength monopole antenna for antenna location 5.



E-PHI  
DB PLOT

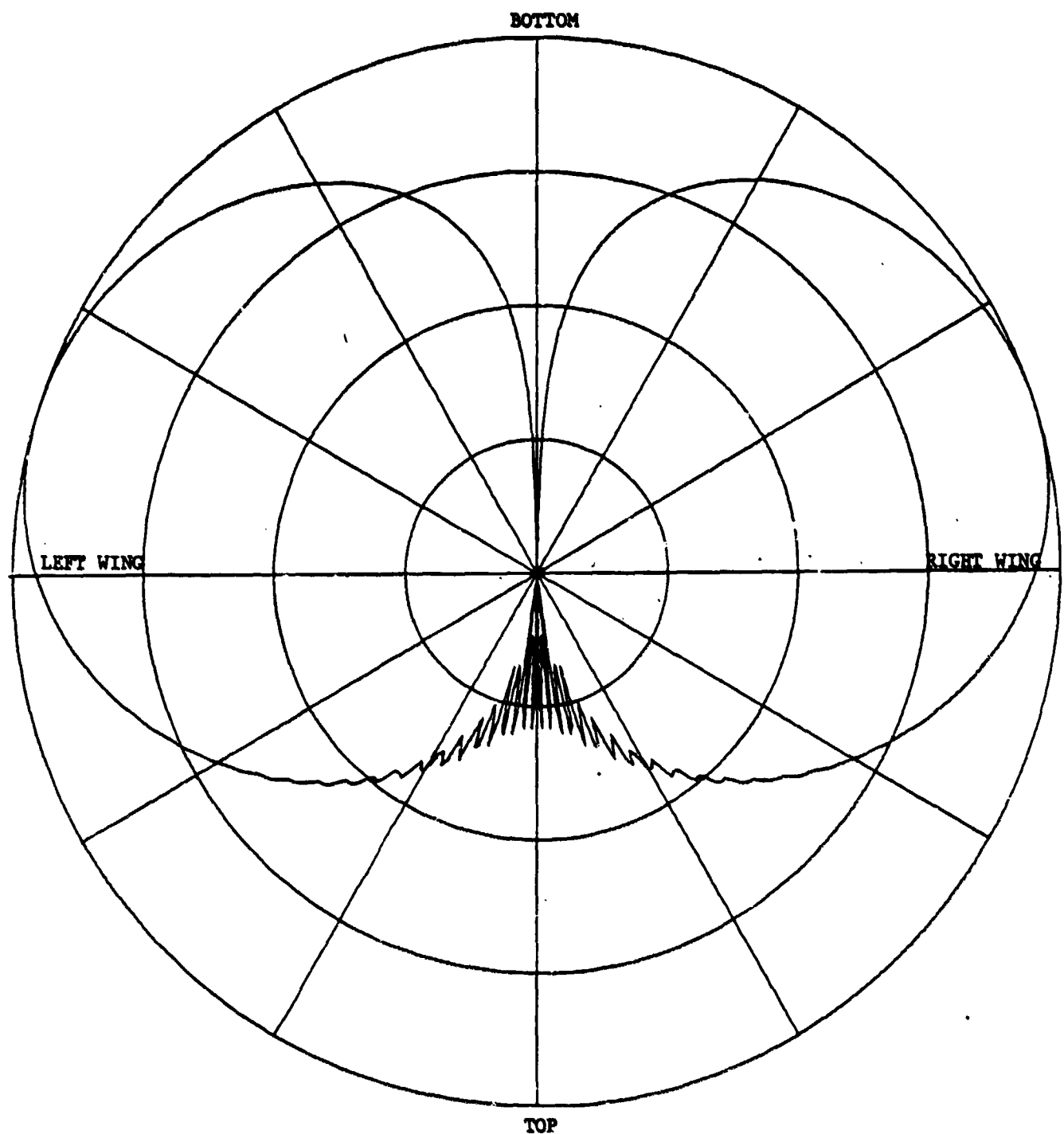


Figure II.29-3. Rockwell Sabreliner 75A. Roll plane pattern for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
34. 23. 30. 23.
0. 0. 0.
PG
S T
R.426 22.214 134.05
R.426 38.3 135.582
R.426 75.834 88.856
R.426 75.834 -12.256
R.426 22.98 -12.256
PG
S T
R.426 -22.98 -12.256
R.426 -75.834 -12.256
R.426 -75.834 88.856
R.426 -38.3 135.582
R.426 -22.214 134.05
SG
1
0. 117.198
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3
EX

```

Figure II.30-1. Rockwell Sabreliner 75A. Data set for antenna location 6.

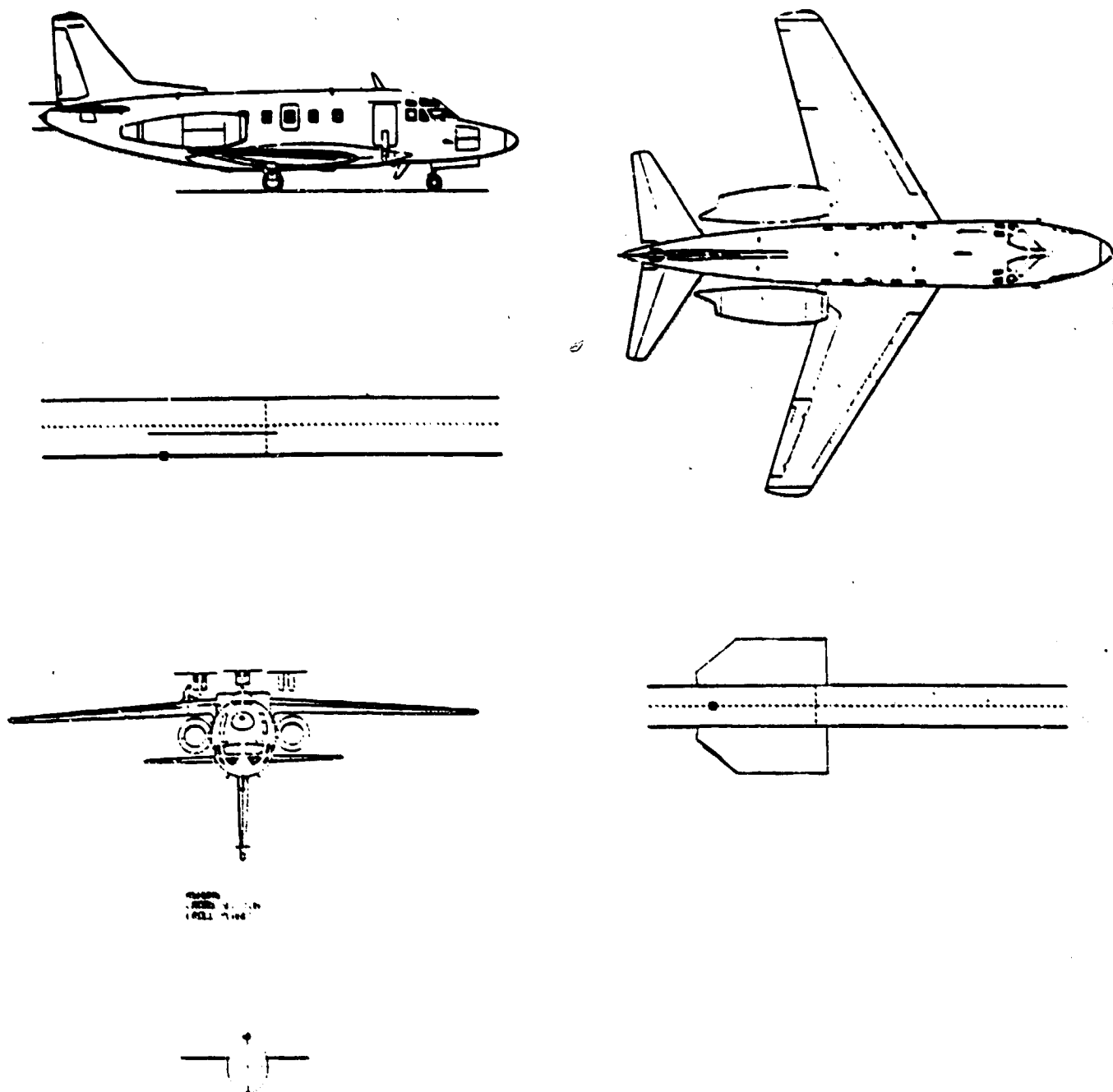


Figure II.30-2. Rockwell Sabreliner 75A. Bottom rear  $1/4$  wavelength monopole antenna for antenna location 6.

E-PHI  
DB PLOT

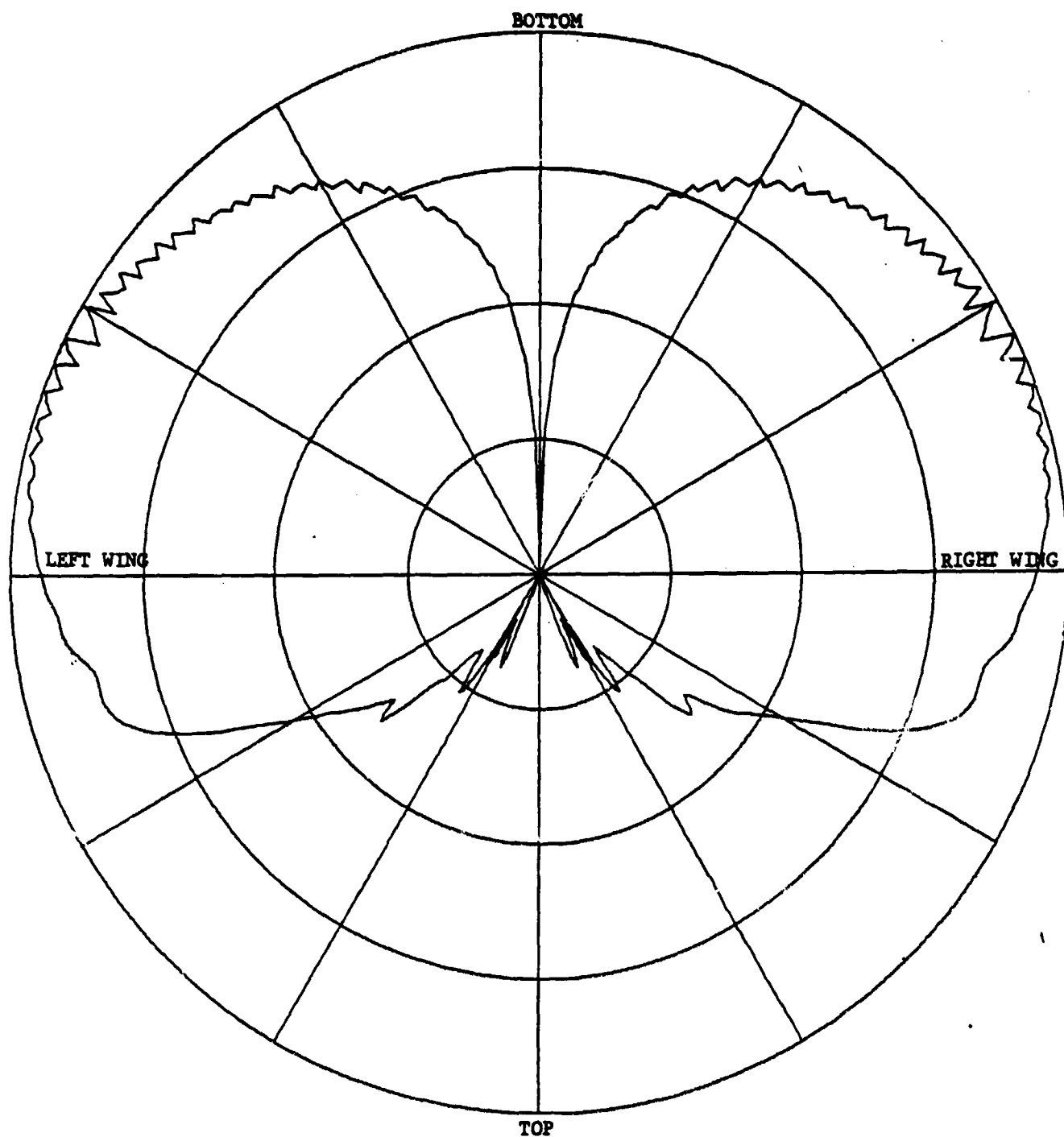


Figure II.30-3. Rockwell Sabreliner 75A. Roll plane pattern for antenna location 6.

#### II.4. Piper PA-31T Cheyenne

Roll plane patterns are calculated for seven particular antenna locations of this aircraft. Various modeling attempts are made for some antenna locations.

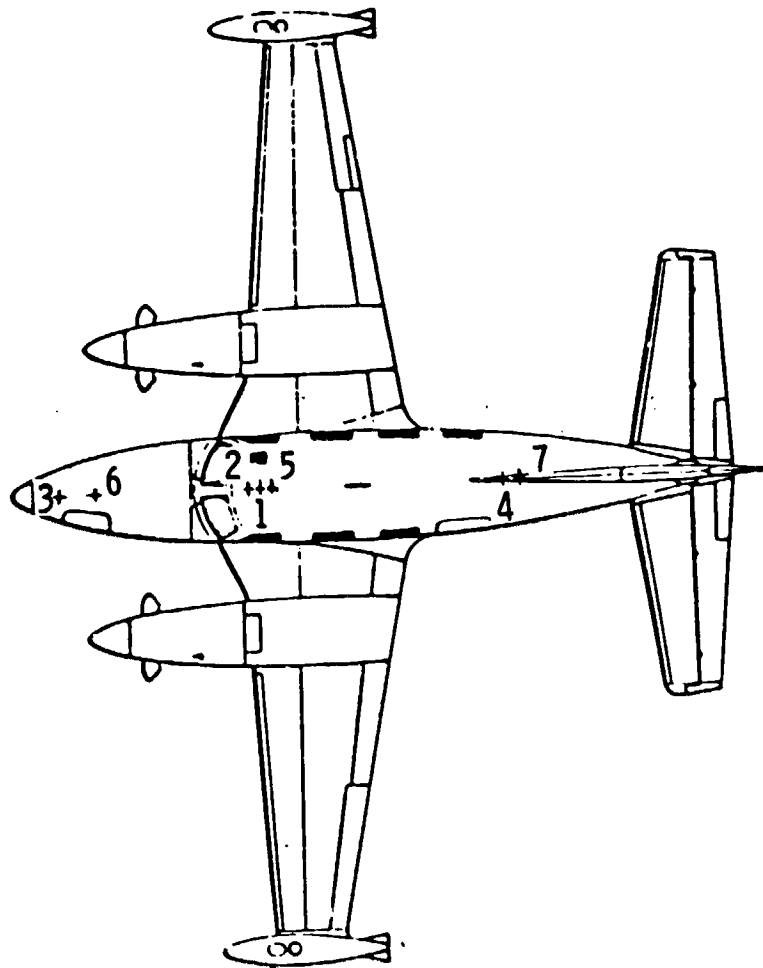
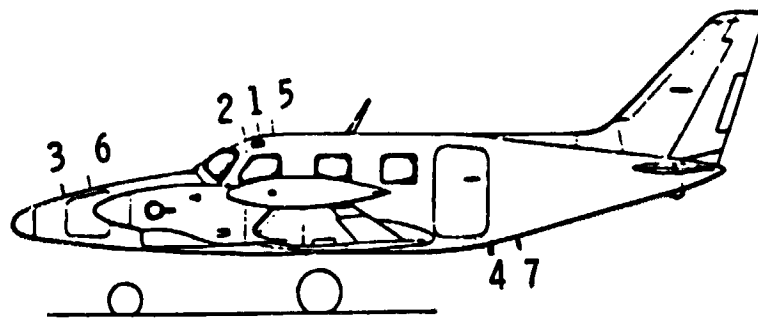


Figure II.31. Piper PA-31T Cheyenne. Antenna locations.

ORIGINAL PAGE IS  
OF POOR QUALITY

29.11018941452 28.21516122925 37.62345682936 28.21516122925  
0. 0. 0.  
PG  
4 T  
-16.248 23.695 -33.173  
-2.708 234.919 -14.217  
-2.708 234.919 23.695  
-16.248 23.695 63.638  
PG  
4 F  
-2.708 234.919 -14.217  
4.739 236.273 -14.217  
4.739 236.273 23.695  
-2.708 234.919 23.695  
PG  
4 F  
4.739 236.273 -14.217  
8.801 241.012 -36.558  
8.801 241.012 46.036  
4.739 236.273 23.695  
PG  
4 F  
8.801 241.012 -36.558  
8.801 248.459 -42.651  
8.801 248.459 46.036  
8.801 241.012 46.036  
PG  
4 T  
-16.248 -23.695 63.638  
-2.708 -234.919 23.695  
-2.708 -234.919 -14.217  
-16.248 -23.695 -33.173  
PG  
4 F  
-2.708 -234.919 23.695  
4.739 -236.273 23.695  
4.739 -236.273 -14.217  
-2.708 -234.919 -14.217  
PG  
4 F  
4.739 -236.273 23.695  
8.801 -241.012 46.036  
8.801 -241.012 -36.558  
4.739 -236.273 -14.217  
PG  
4 F  
8.801 -241.012 46.036  
8.801 -248.459 46.036

8.801 -248.459 -42.651  
8.801 -241.012 -36.558  
SG  
1.  
0.0 -17.602  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.32-1. Piper PA-31T Cheyenne. Data set for  
antenna location 1.

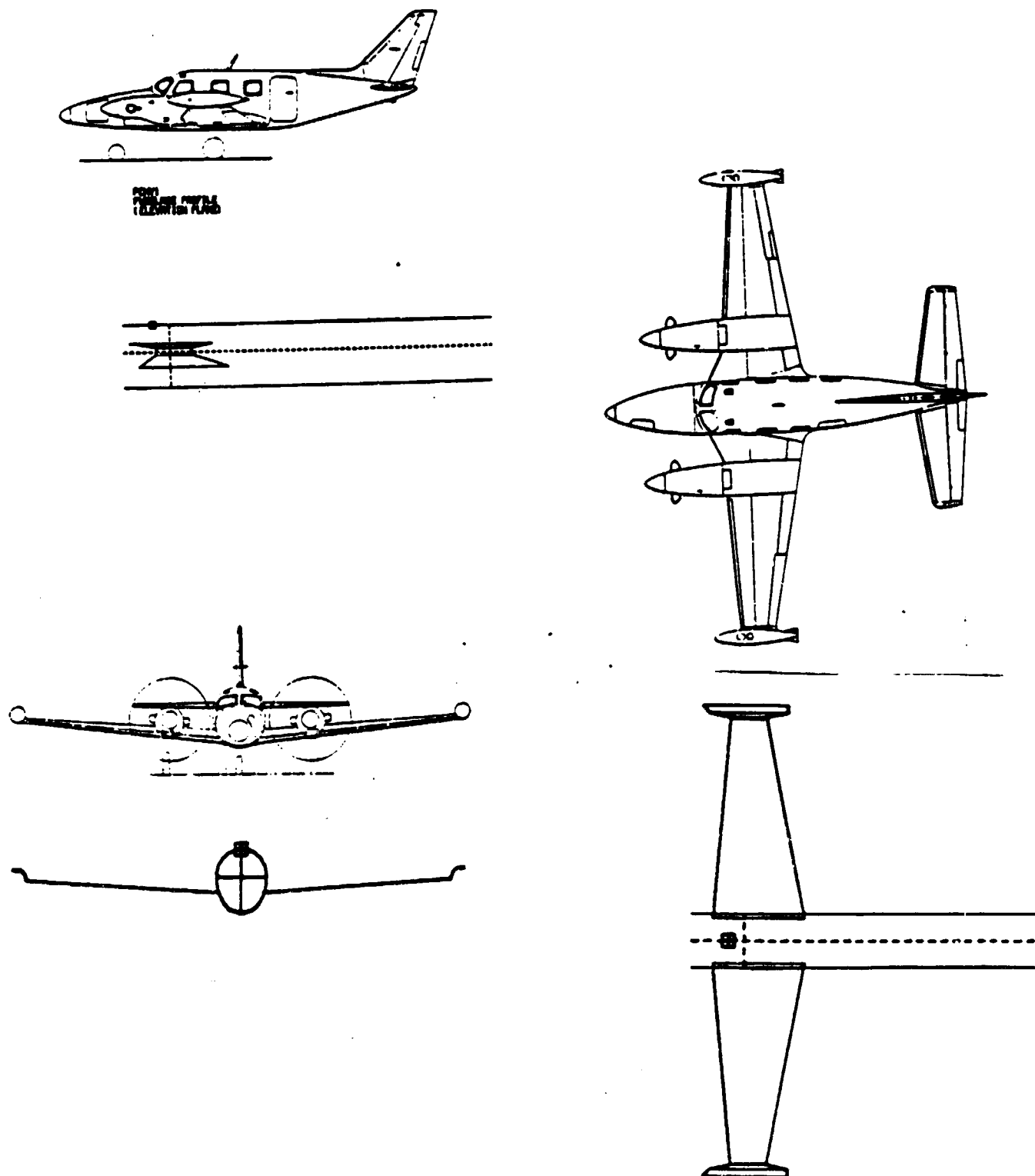


Figure II.32-2. Piper PA-31T Cheyenne. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 1.



E-PHI  
DB PLOT

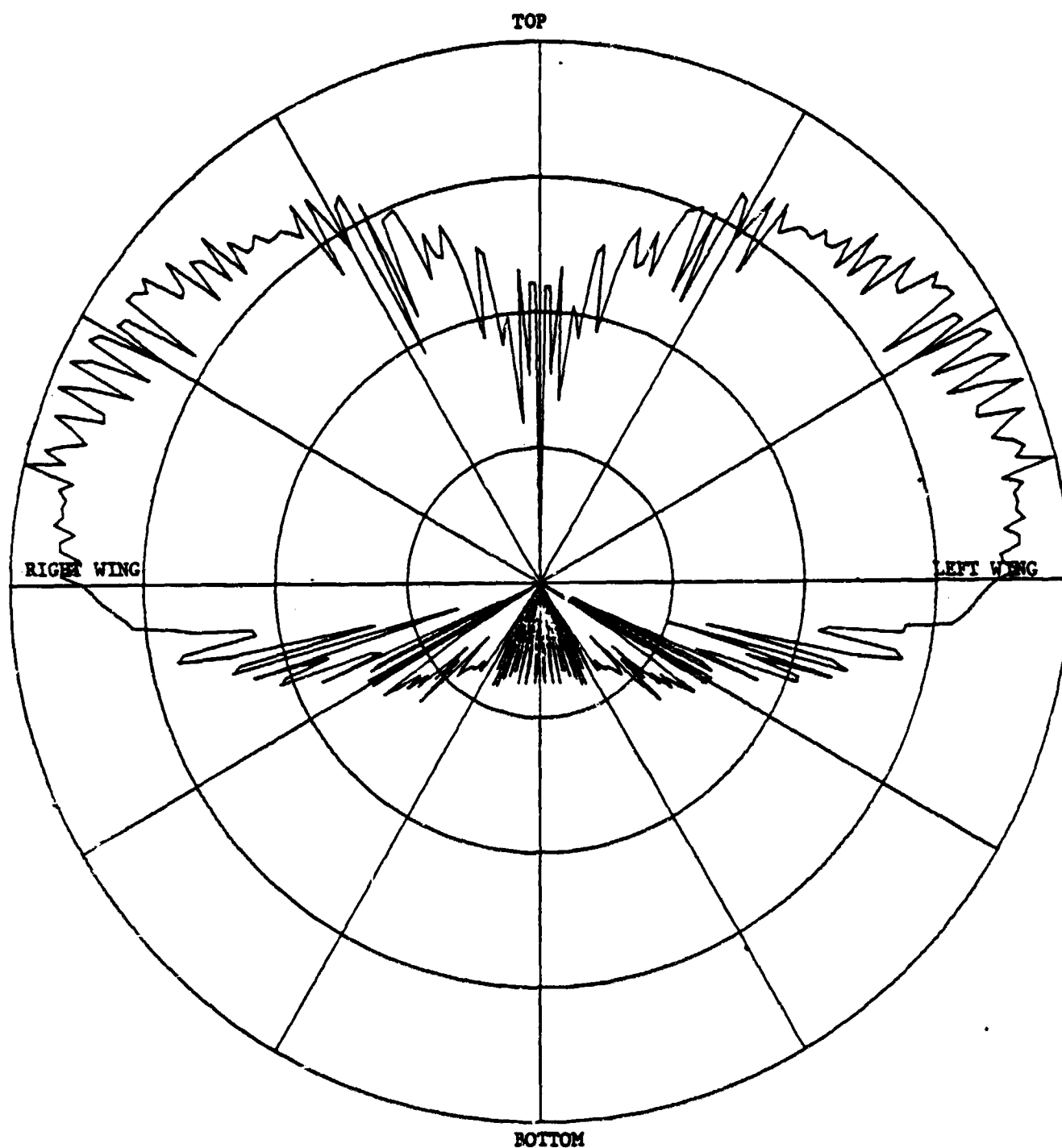


Figure II.32-3. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
29.11014941452 28.21516122925 37.62345682936 28.21516122925  
0. 0. 0.  
PG  
4 T  
-16.248 23.695 -33.173  
-2.708 234.919 -14.217  
-2.708 234.919 23.695  
-16.248 23.695 63.638  
PG  
4 T  
-16.248 -23.695 63.638  
-2.708 -234.919 23.695  
-2.708 -234.919 -14.217  
-16.248 -23.695 -33.173  
SG  
1  
0.0 -17.602  
0. 0. 0. 25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
FX

Figure II.33-1. Piper PA-31T Cheyenne. Data set modeled without fuel tanks for antenna location 1.

E-PHI  
DB PLOT

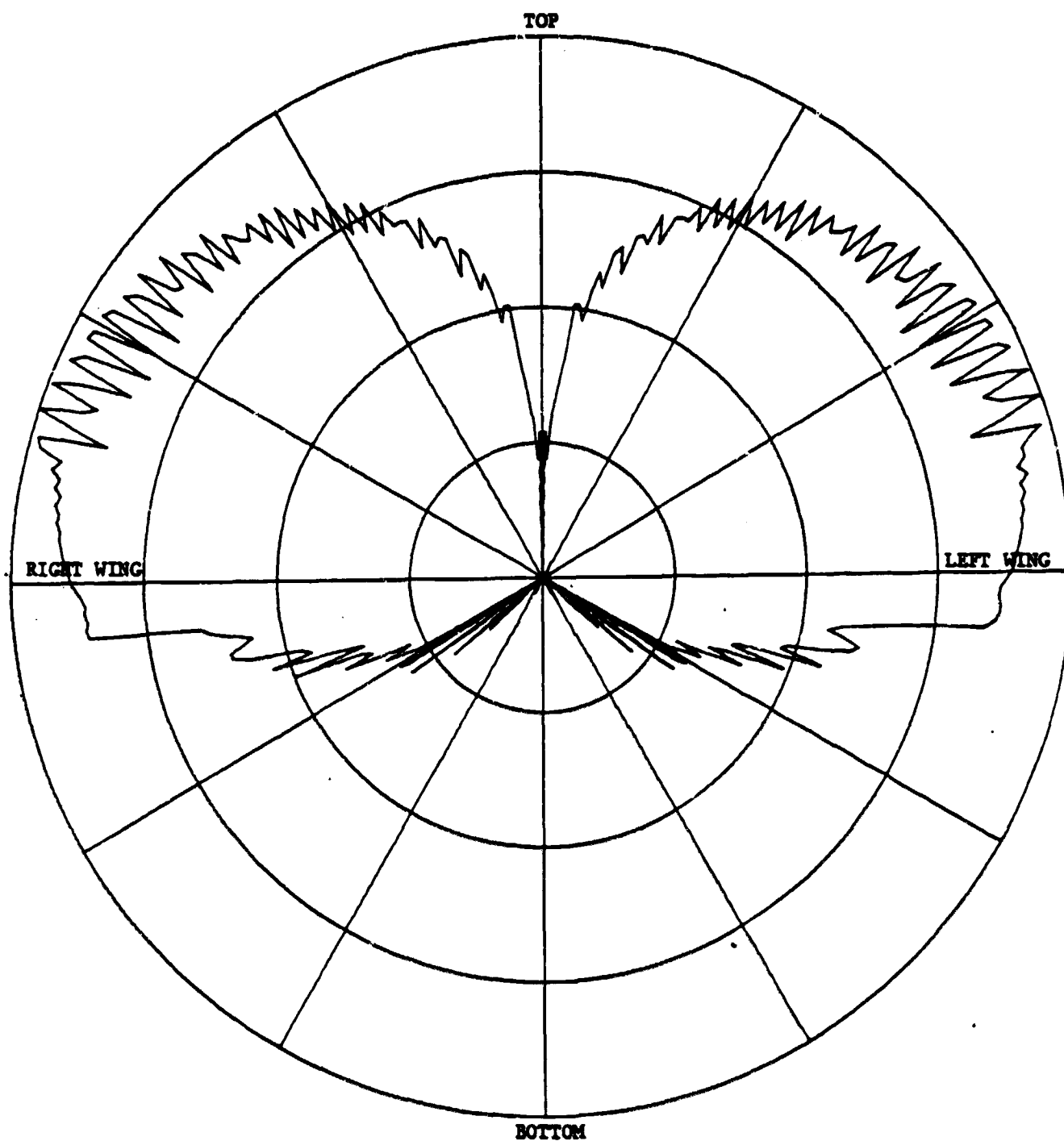


Figure II.33-2. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
28.0 28.21516122925 37.62345682936 78.21316122925  
0. 0. 0.  
PG  
4 T  
-16.248 23.695 -33.173  
-2.708 234.919 -14.217  
-2.708 234.919 23.695  
-16.248 23.695 63.638  
PG  
4 F  
-2.708 234.919 -14.217  
4.739 236.273 -14.217  
4.739 236.273 23.695  
-2.708 234.919 23.695  
PG  
4 F  
4.739 236.273 -14.217  
8.801 241.012 -36.558  
8.801 241.012 46.036  
4.739 236.273 23.695  
PG  
4 F  
8.801 241.012 -36.558  
8.801 248.459 -42.651  
8.801 248.459 46.036  
8.801 241.012 46.036  
PG  
4 T  
-16.248 -23.695 63.638  
-2.708 -234.919 23.695  
-2.708 -234.919 -14.217  
-16.248 -23.695 -33.173  
PG  
4 F  
-2.708 -234.919 23.695  
4.739 -236.273 23.695  
4.739 -236.273 -14.217  
-2.708 -234.919 -14.217  
PG  
4 F  
4.739 -236.273 23.695  
8.801 -241.012 46.036  
8.801 -241.012 -36.558  
4.739 -236.273 -14.217  
PG  
4 F  
8.801 -241.012 46.036  
8.801 -248.459 46.036

8.801 -248.459 -42.651  
8.801 -241.012 -36.558  
SG  
1  
0.0 -23.019  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.34-1. Piper PA-31T Cheyenne. Data set for antenna location 2.

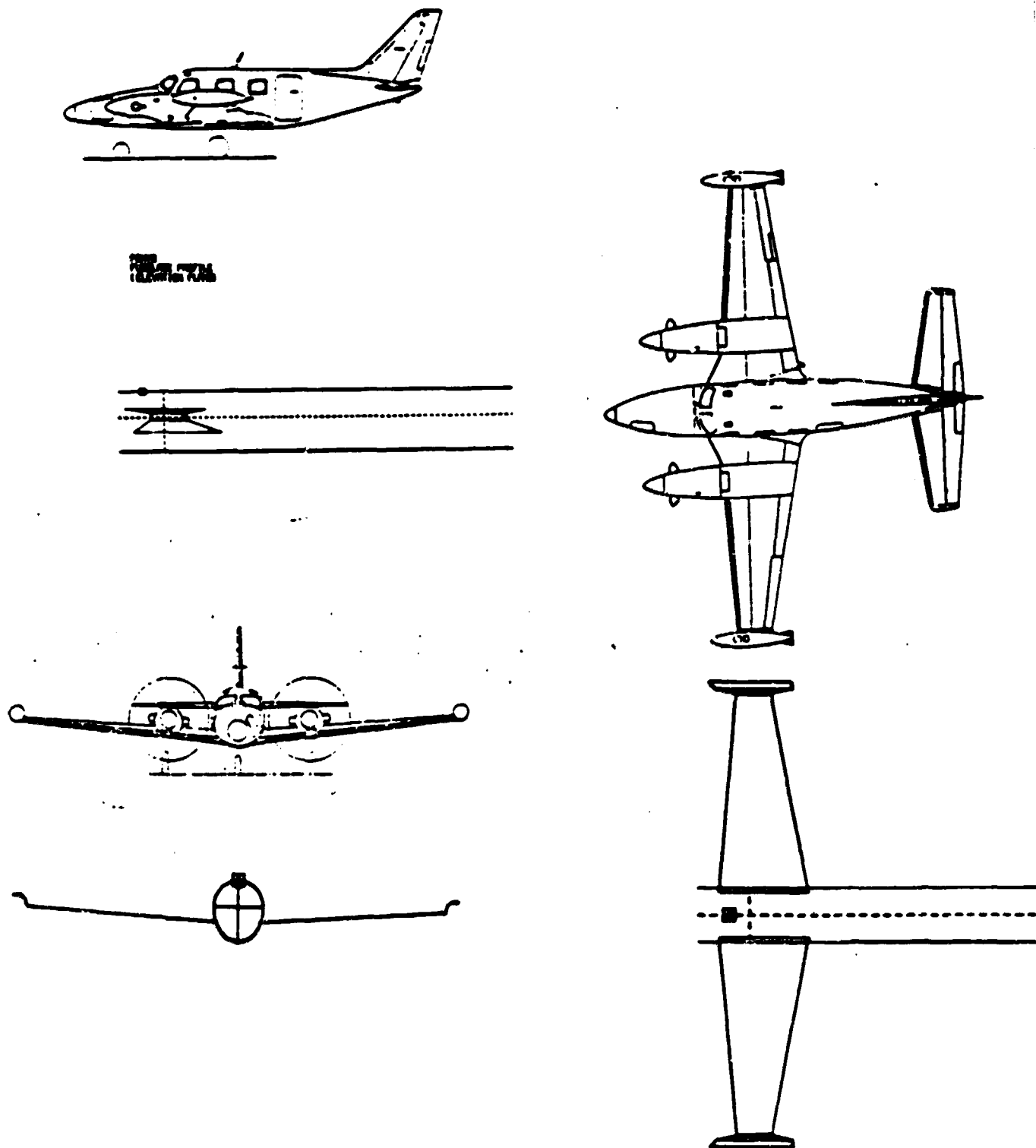


Figure IV.34-2. Piper PA-31T Cheyenne. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

E-PHI  
DB PLCT

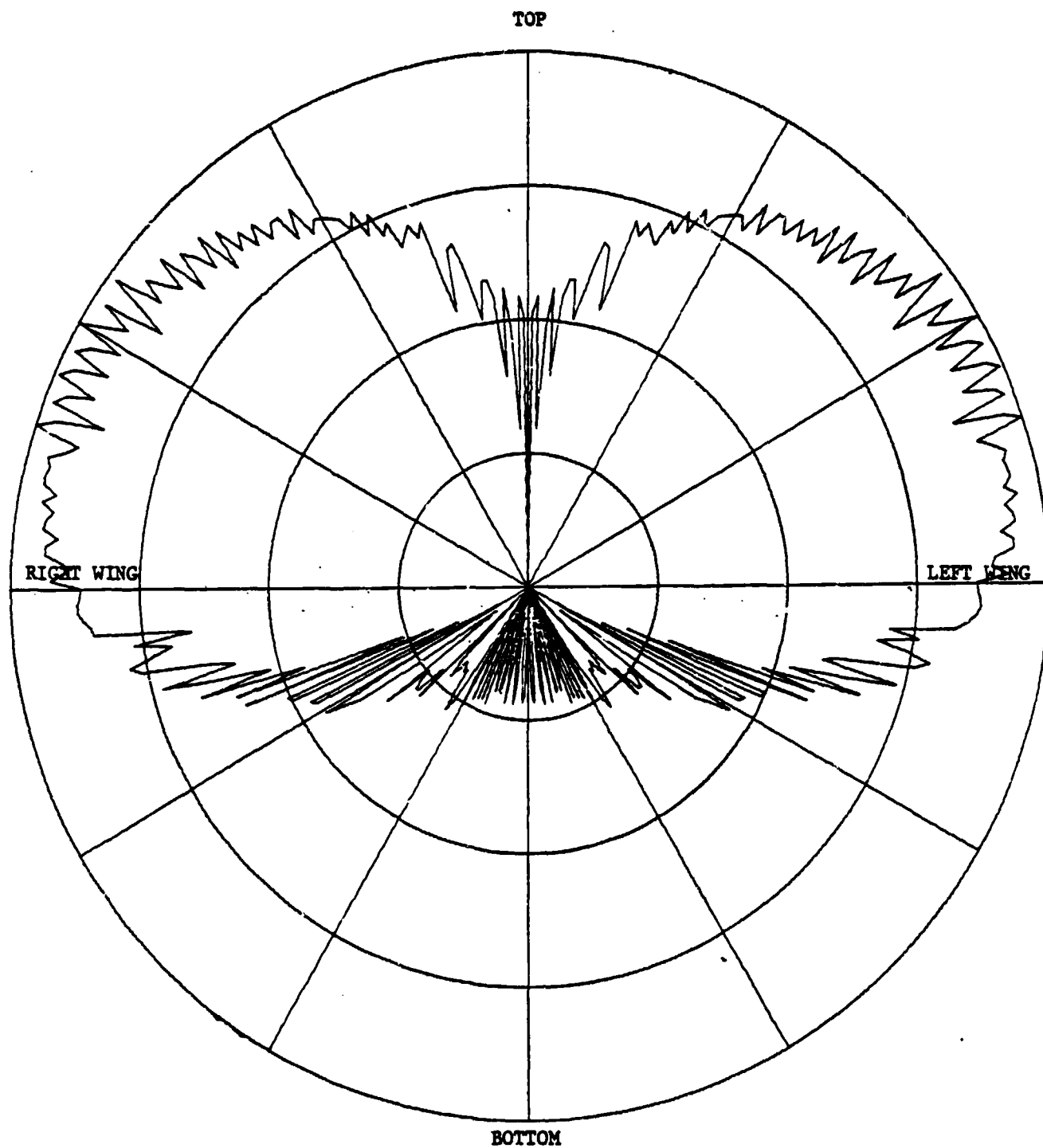


Figure II.34-3. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
24.0 28.21516122925 37.62345682936 28.21516122925
0. 0. 0.
PG
4 T
-16.248 23.695 -33.173
-2.708 234.919 -14.217
-2.708 234.919 23.695
-16.248 23.695 63.638
PG
4 T
-16.248 -23.695 63.638
-2.708 -234.919 23.695
-2.708 -234.919 -14.217
-16.248 -23.695 -33.173
SG
1
0.0 -23.018
0. 0. 0. 25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000, 5,2
PP
3.75 3
EX

```

Figure II.35-1. Piper PA-31T Cheyenne. Data set modeled  
without fuel tanks for antenna location 2.

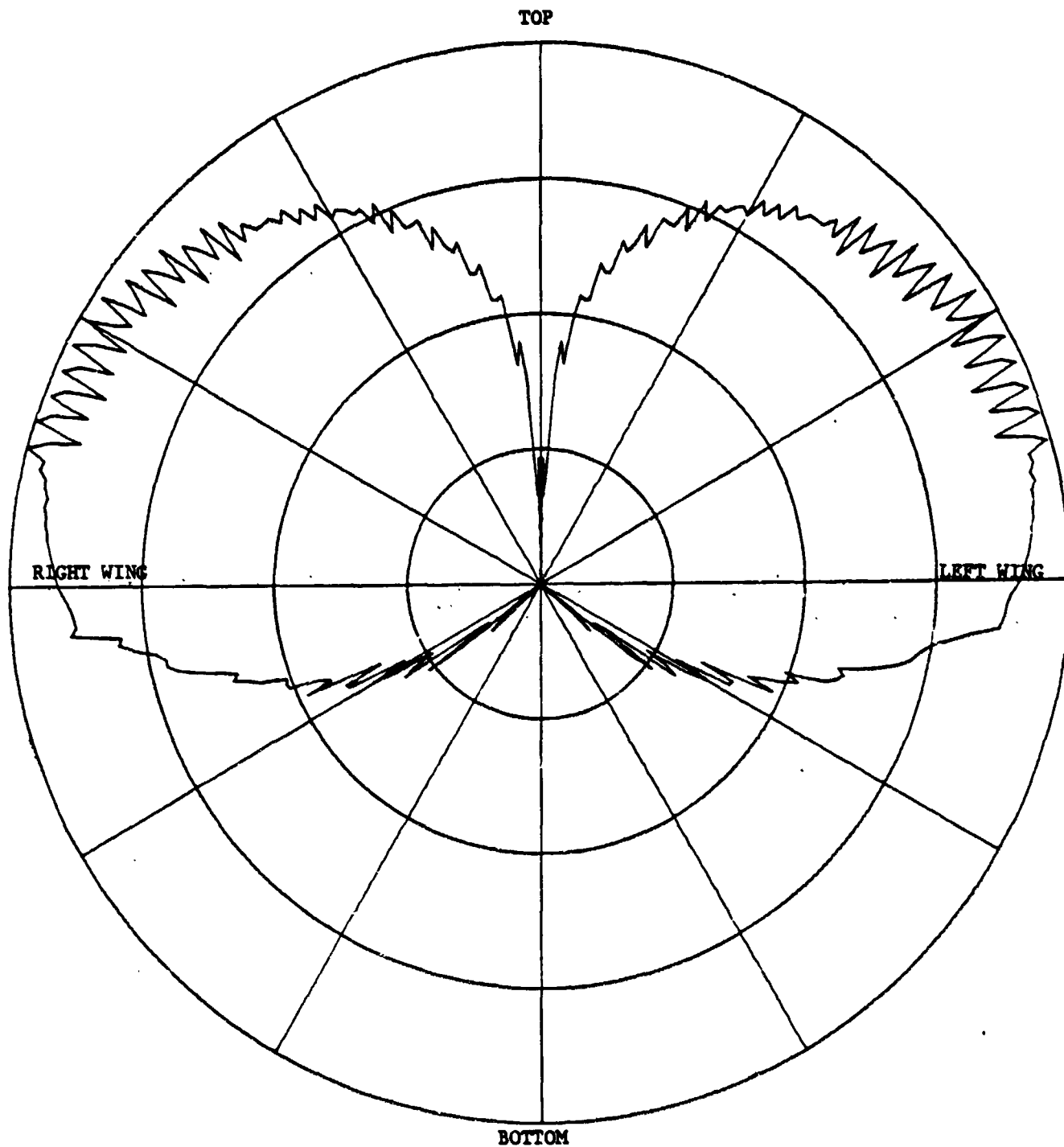


Figure II.35-2. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 2.



ORIGINAL PAGE IS  
OF POOR QUALITY

PG  
17.0 14.0 11.0 14.0  
0. 0. 0.  
PG  
4 F  
4.062 67.023 -24.372  
22.341 67.023 -24.372  
22.341 67.023 121.183  
4.062 67.023 121.183  
PG  
4 F  
22.341 67.023 -24.372  
22.341 85.979 -24.372  
22.341 85.979 121.183  
22.341 67.023 121.183  
PG  
4 F  
4.062 85.979 -24.372  
4.062 85.979 121.183  
22.341 85.979 121.183  
22.341 85.979 -24.372  
PG  
4 F  
4.062 67.023 -24.372  
4.062 67.023 121.183  
4.062 85.979 121.183  
4.062 85.979 -24.372  
PG  
3 F  
22.341 67.023 -24.372  
12.186 76.501 -46.713  
22.341 85.979 -24.372  
PG  
3 F  
4.062 67.023 -24.372  
12.186 76.501 -46.713  
22.341 67.023 -24.372  
PG  
4 F  
55.5 76.501 -34.527  
55.5 76.501 -27.341  
-31.142 76.501 -27.341  
-31.142 76.501 -34.527  
SG  
1  
0. -60.0  
0. 0. 0. .25 3  
1. 0.  
00

0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.36-1. Piper PA-31T Cheyenne. Data set for antenna location 3.

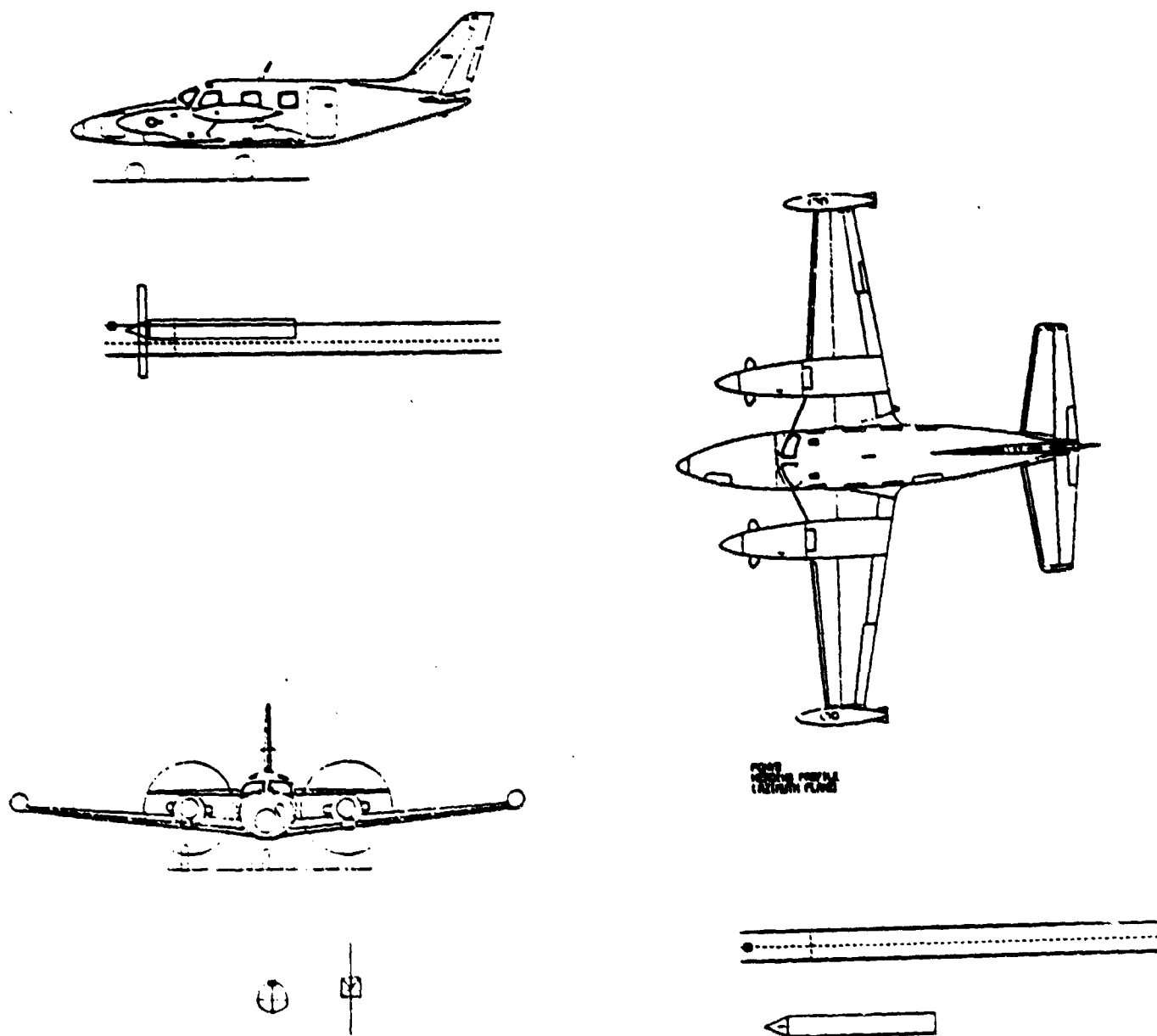


Figure II.36-2. Piper PA-31T Cheyenne. Top front 1/4 wavelength monopole forward of cockpit for antenna location 3.

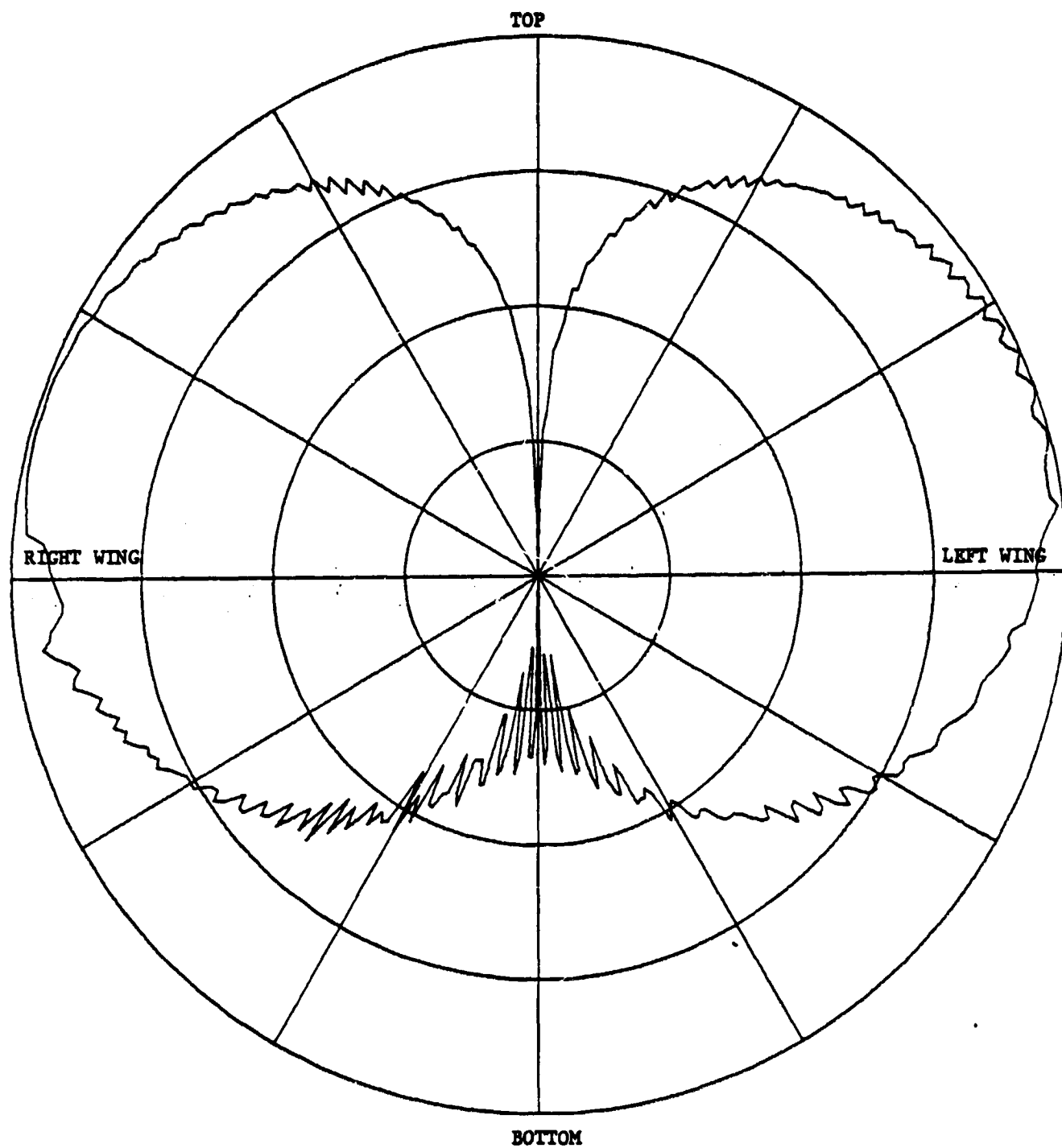


Figure II.36-3. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
17.0 14.0 11.0 14.0  
0. 0. 0.  
PG  
4 F  
4.062 67.023 -24.372  
22.341 67.023 -24.372  
22.341 67.023 121.183  
4.062 67.023 121.183  
PG  
4 F  
22.341 67.023 -24.372  
22.341 85.979 -24.372  
22.341 85.979 121.183  
22.341 67.023 121.183  
PG  
4 F  
4.062 85.979 -24.372  
4.062 85.979 121.183  
22.341 85.979 121.183  
22.341 85.979 -24.372  
PG  
4 F  
4.062 67.023 -24.372  
4.062 67.023 121.183  
4.062 85.979 121.183  
4.062 85.979 -24.372  
PG  
3 F  
22.341 67.023 -24.372  
12.186 76.501 -46.713  
22.341 85.979 -24.372  
PG  
3 F  
4.062 67.023 -24.372  
12.186 76.501 -46.713  
22.341 67.023 -24.372  
SG  
1  
0. -60.0  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
FX

Figure II.37-1. Piper PA-31T Cheyenne. Data set modeled without  
propeller for antenna location 3.

E-PHI  
DB PLOT

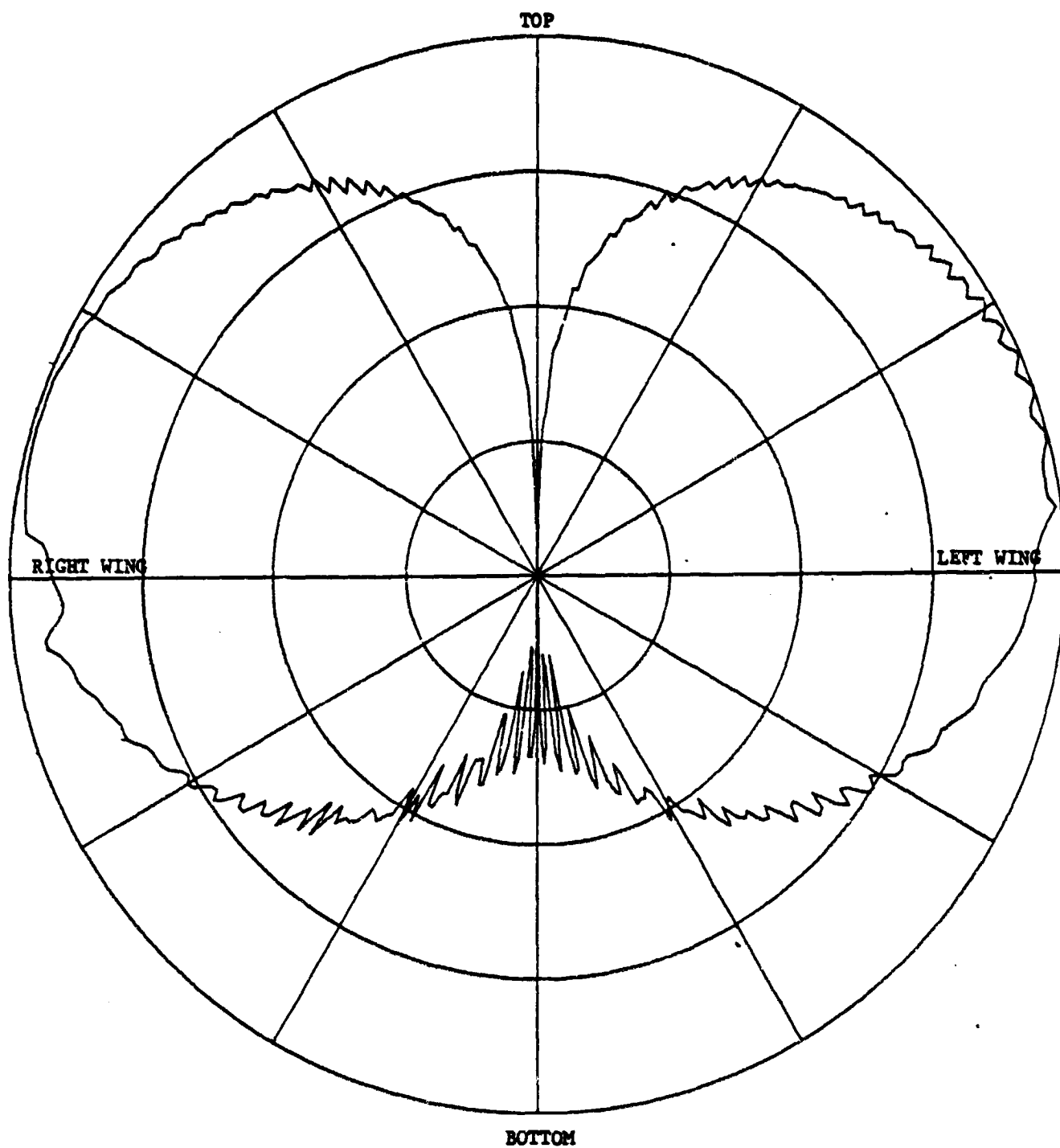


Figure II.37-2. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG				
	17.0	14.0	11.0	14.0
	0.	0.	0.	
PG				
4 F				
	4.062	67.023	-24.372	
	22.341	67.023	-24.372	
	22.341	67.023	121.183	
	4.062	67.023	121.183	
PG				
4 F				
	22.341	67.023	-24.372	
	22.341	85.979	-24.372	
	22.341	85.979	121.183	
	22.341	67.023	121.183	
PG				
4 F				
	4.062	85.979	-24.372	
	4.062	85.979	121.183	
	22.341	85.979	121.183	
	22.341	85.979	-24.372	
PG				
4 F				
	4.062	67.023	-24.372	
	4.062	67.023	121.183	
	4.062	85.979	121.183	
	4.062	85.979	-24.372	
SG				
1				
	0.	-60.0		
	0.	0.	0.	.25 3
	1.	0.		
PD				
	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP				
	3.75	3		
EX				

Figure II.38-1. Piper PA-31T Cheyenne. Data set modeled without propeller housing for antenna location 3.

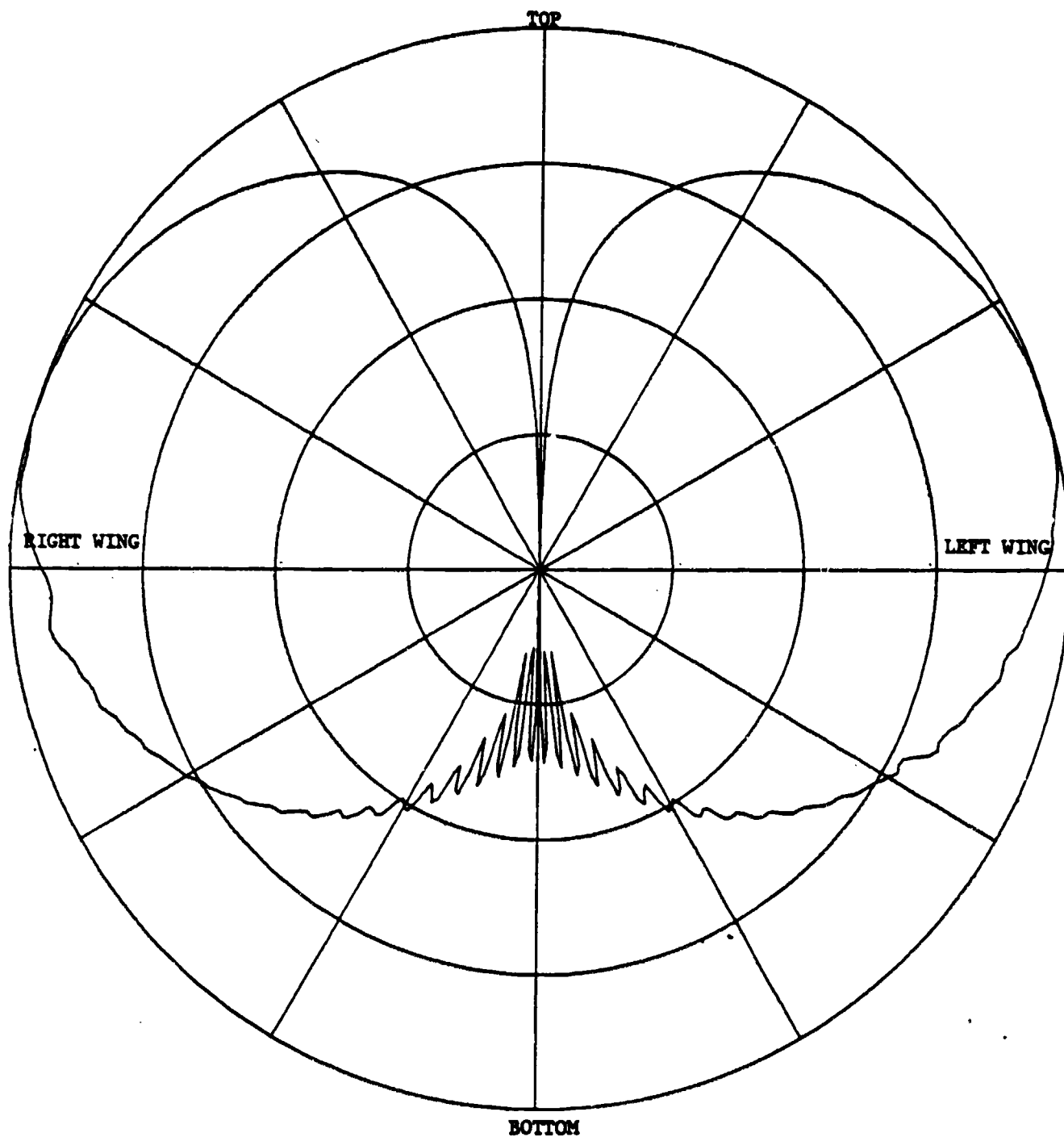


Figure II.38-2. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	
	31.0 25.0 24.52507838426 25.0
	0. 0. 0.
SG	
	1
	0. -39.943
	0. 0. 0. .25 3
	1. 0.
PD	
	0. 0. 90.
	0 360 1
	50000. 5.2
PP	
	3.75 3
FX	

Figure II.39-1. Piper PA-31T Cheyenne. Data set for antenna location 4.



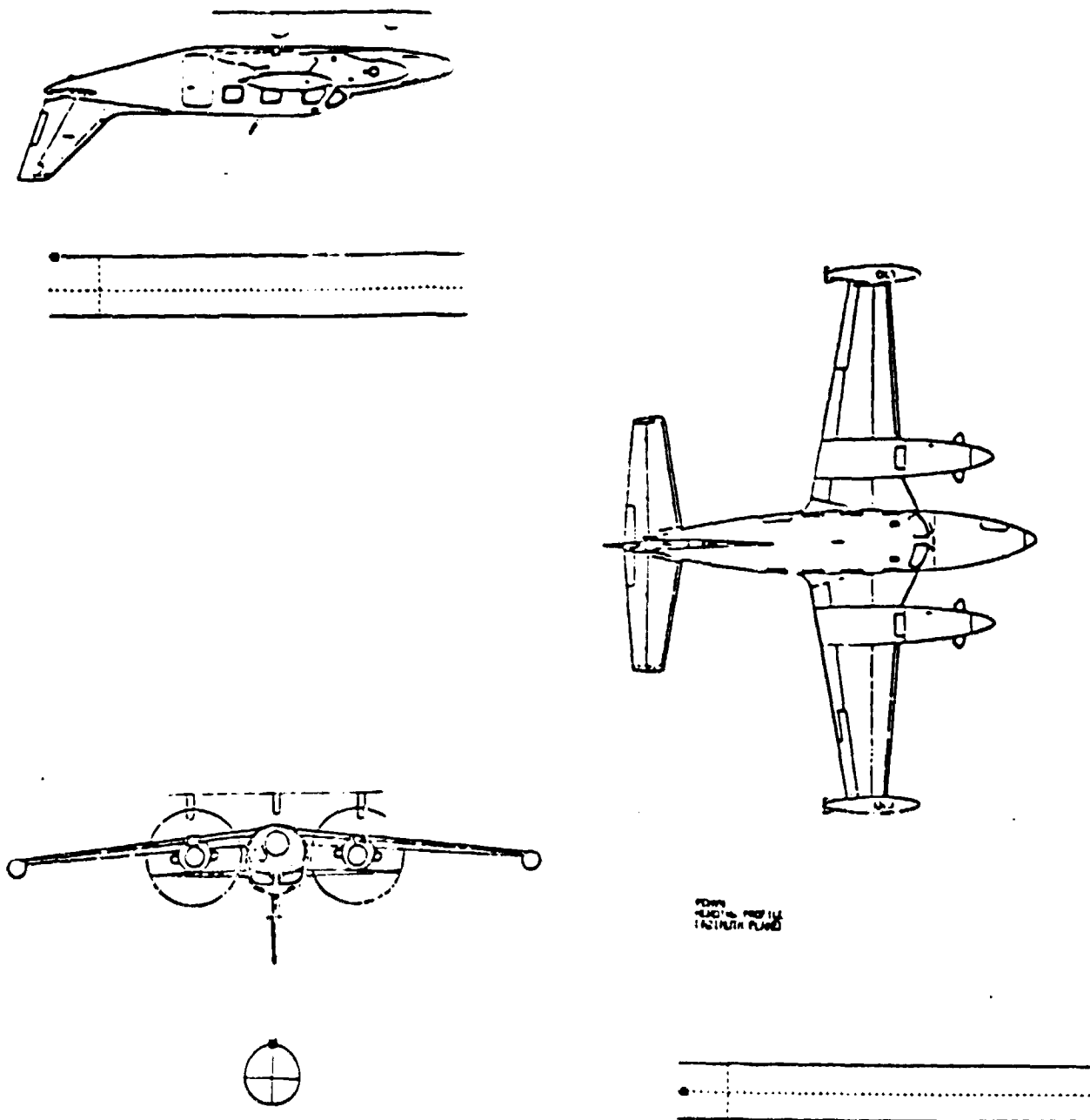


Figure II.39-2. Piper PA-31T Cheyenne. Bottom rear  $1/4$  wavelength monopole antenna for antenna location 4.

E-PHI  
DB PLOT

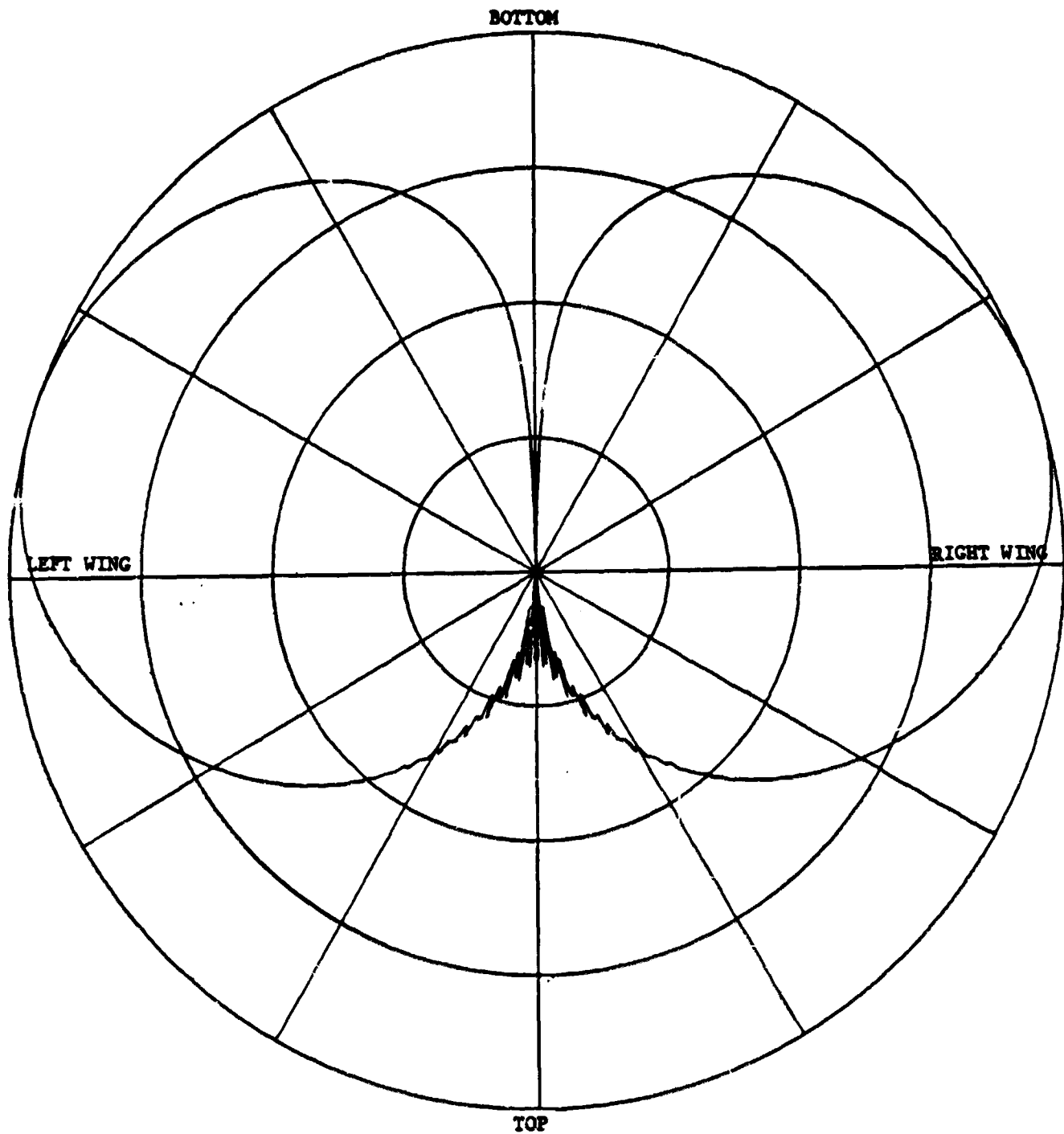


Figure II.39-3. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
29.1101894152 28.2316122929 37.62345682936 28.21516122929
0. 0. 0.
PG
4 T
-16.248 23.695 -33.173
-2.708 234.919 -14.217
-2.708 234.919 23.695
-16.248 23.695 63.638
PG
4 F
-2.708 234.919 -14.217
4.739 236.273 -14.217
4.739 236.273 23.695
-2.708 234.919 23.695
PG
4 F
4.739 236.273 -14.217
8.801 241.012 -36.558
8.801 241.012 46.036
4.739 236.273 23.695
PG
4 F
8.801 241.012 -36.558
8.801 248.459 -42.651
8.801 248.459 46.036
8.801 241.012 46.036
PG
4 T
-16.248 -23.695 63.638
-2.708 -234.919 23.695
-2.708 -234.919 -14.217
-16.248 -23.695 -33.173
PG
4 F
-2.708 -234.919 23.695
4.739 -236.273 23.695
4.739 -236.273 -14.217
-2.708 -234.919 -14.217
PG
4 F
4.739 -236.273 23.695
8.801 -241.012 46.036
8.801 -241.012 -36.558
4.739 -236.273 -14.217
PG
4 F
8.801 -241.012 46.036
8.801 -248.459 46.036

```

```

8.801 -248.459 -42.651
8.801 -241.012 -36.558
SG
1
0. -12.186
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3
EX

```

Figure II.40-1. Piper PA-31T Cheyenne. Data set for antenna location 5.

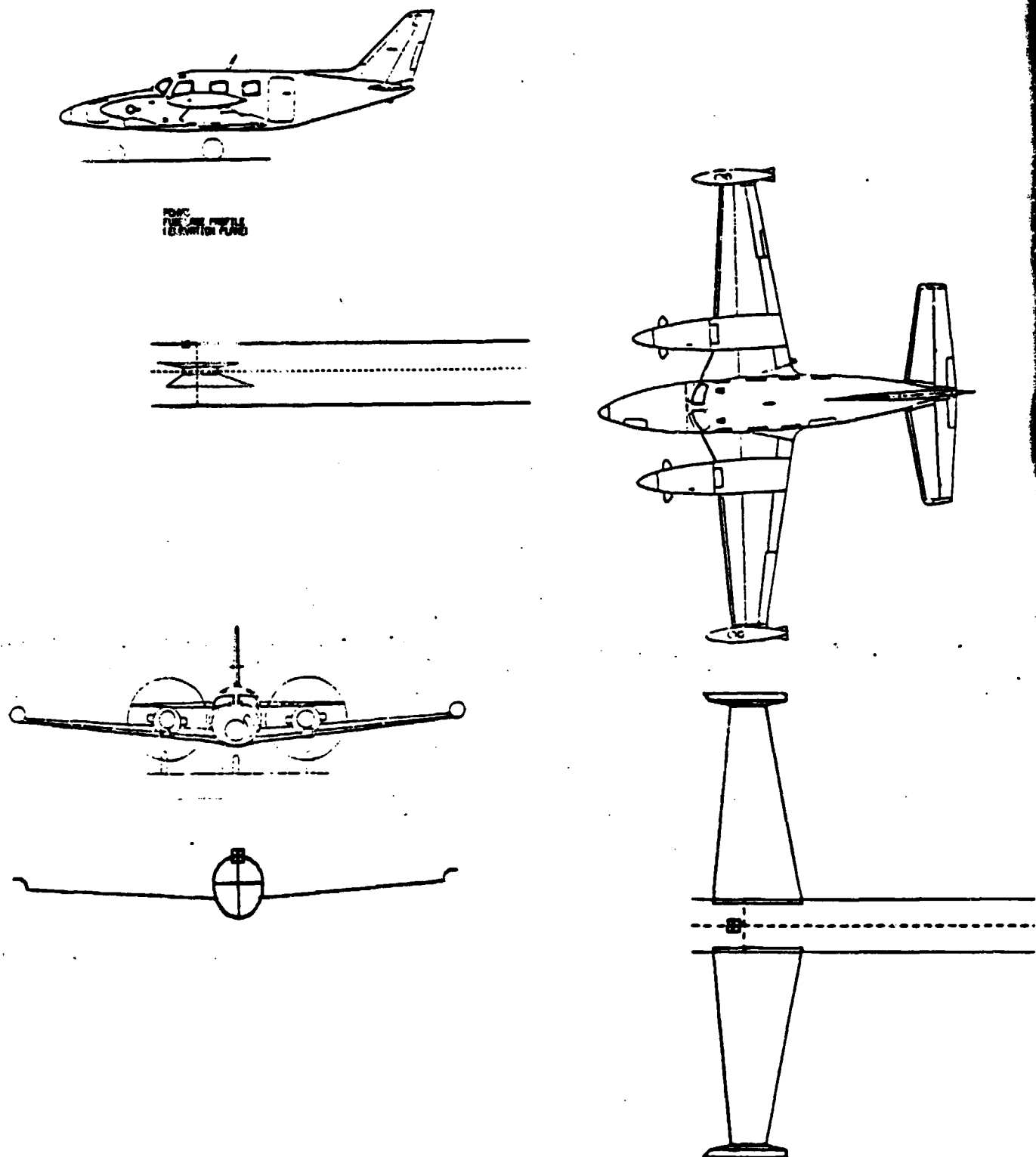


Figure II.40-2. Piper PA-31T Cheyenne. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 5.

E-PHI  
DB PLOT

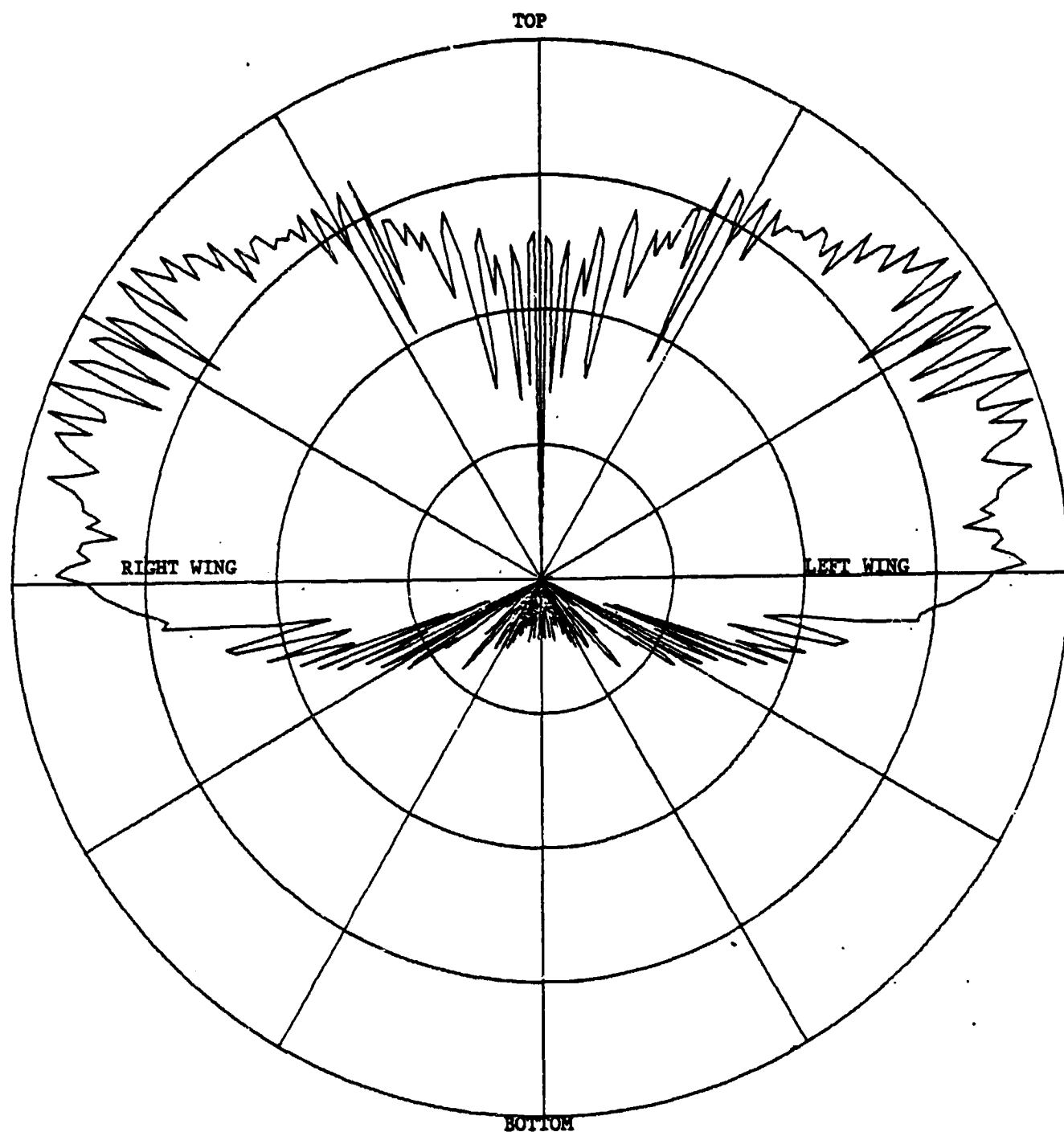


Figure II.40-3. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
29.11019941452 28.21516122925 37.62345682936 28.21516122925  
0. 0. 0.  
PG  
4 T  
-16.248 23.695 -33.173  
-2.708 234.919 -14.217  
-2.708 234.919 23.695  
-16.248 23.695 63.638  
PG  
4 T  
-16.248 -23.695 63.638  
-2.708 -234.919 23.695  
-2.708 -234.919 -14.217  
-16.248 -23.695 -33.173  
SG  
1  
0. -12.186  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.41-1. Piper PA-31T Cheyenne. Data set modeled without fuel tanks for antenna location 5.

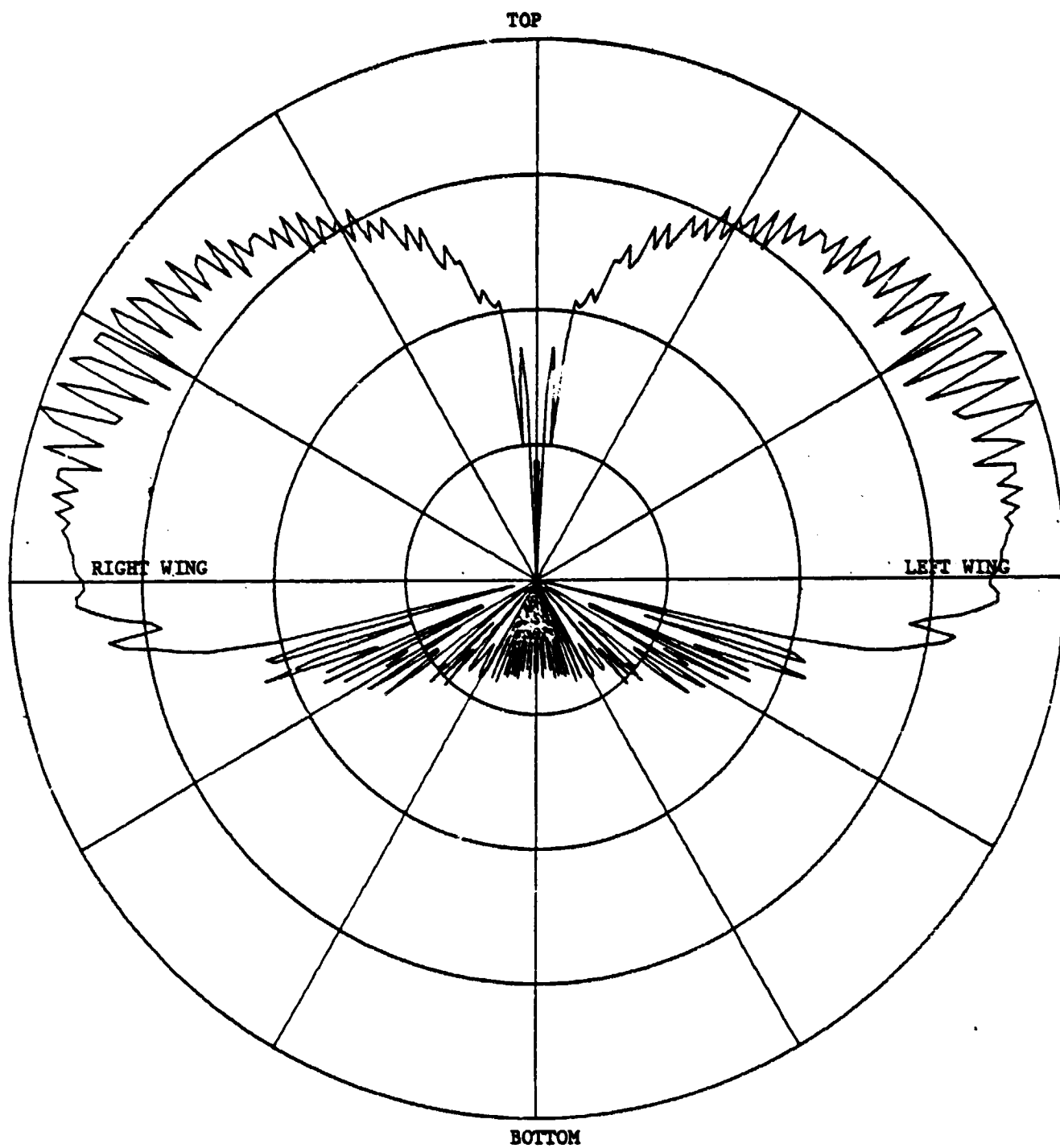


Figure I.41-2. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 5.

PG  
22.46843334672 18.0 14.59171384603 18.0  
0. 0. 0.

PG  
4 F  
4.062 67.023 -24.372  
22.341 67.023 -24.372  
22.341 67.023 121.183  
4.062 67.023 121.183

PG  
4 F  
22.341 67.023 -24.372  
22.341 85.979 -24.372  
22.341 85.979 121.183  
22.341 67.023 121.183

PG  
4 F  
4.062 85.979 -24.372  
4.062 85.979 121.183  
22.341 85.979 121.183  
22.341 85.979 -24.372

PG  
4 F  
4.062 67.023 -24.372  
4.062 67.023 121.183  
4.062 85.979 121.183  
4.062 85.979 -24.372

PG  
3 F  
22.341 67.023 -24.372  
12.186 76.501 -46.713  
22.341 85.979 -24.372

PG  
3 F  
4.062 67.023 -24.372  
12.186 76.501 -46.713  
22.341 67.023 -24.372

PG  
4 F  
55.5 76.501 -34.527  
55.5 76.501 -27.341  
-31.142 76.501 -27.341  
-31.142 76.501 -34.527

SG  
1  
0. -44.005  
0. 0. 0. .25 3  
1. 0.

PN

0. 0. 90.  
0 360 1  
50000. 5.2

PP  
3.75 3  
EX

Figure II.42-1. Piper PA-31T Cheyenne. Data set for antenna location 6.



ORIGINAL PAGE IS  
OF POOR QUALITY

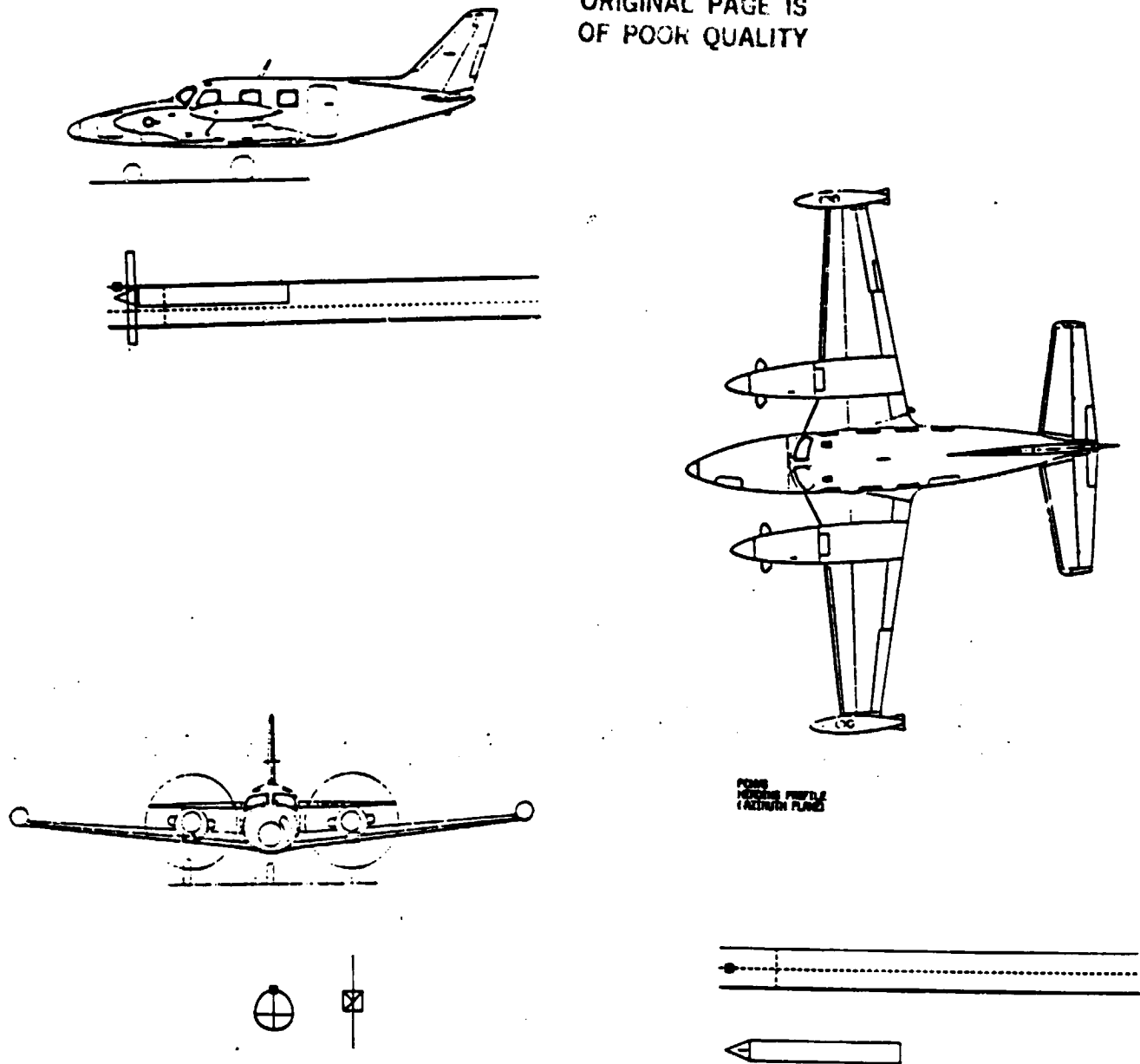


Figure II.42-2. Piper PA-31T Cheyenne. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 6.

E-PHI  
DB PLOT

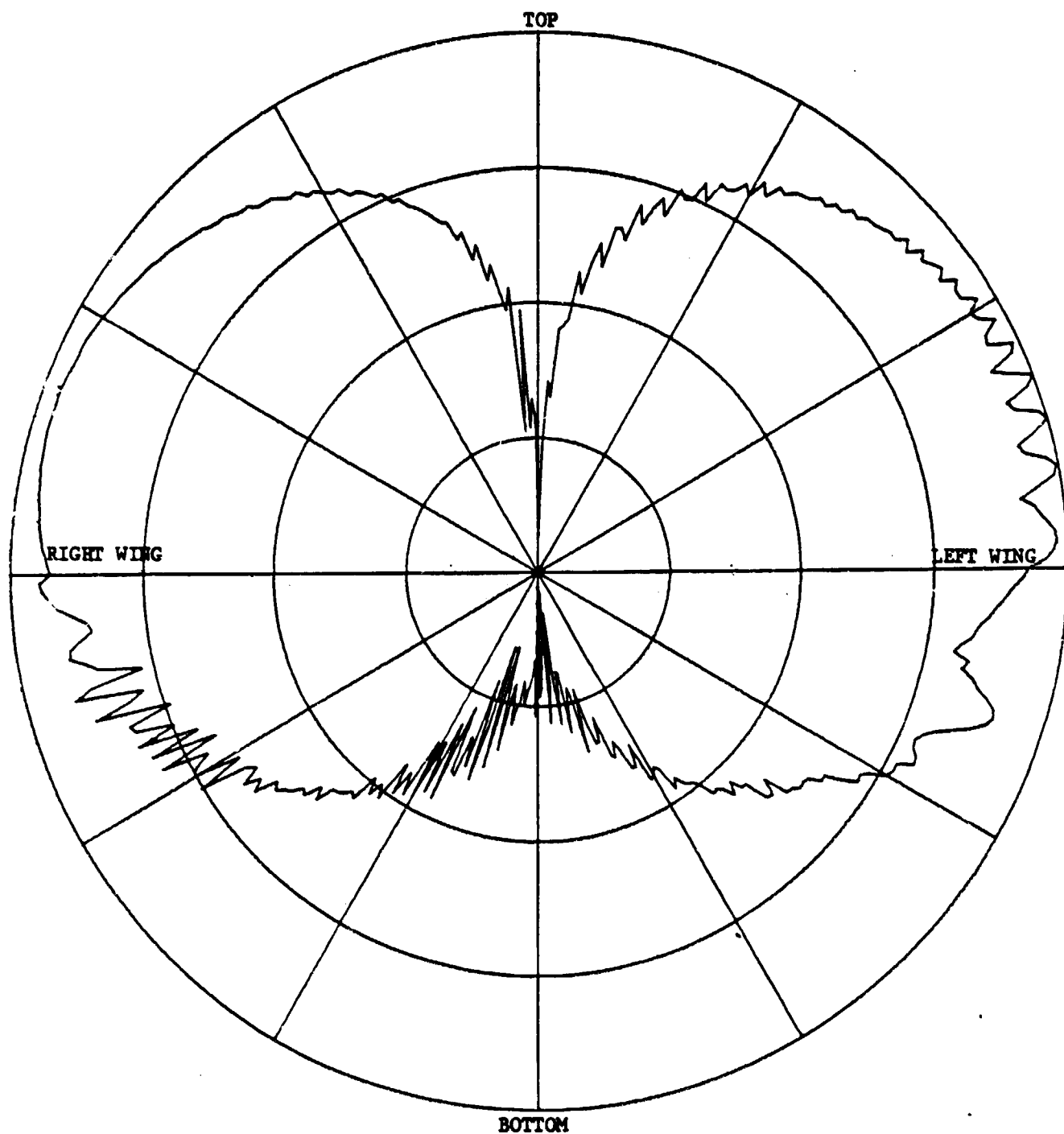


Figure II.42-3. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 6.

```

FG
22.46843334672 18.0 14.59171384603 18.0
0. 0. 0.
PG
4 F
4.062 67.023 -24.372
22.341 67.023 -24.372
22.341 67.023 121.183
4.062 67.023 121.183
PG
4 F
22.341 67.023 -24.372
22.341 85.979 -24.372
22.341 85.979 121.183
22.341 67.023 121.183
PG
4 F
4.062 85.979 -24.372
4.062 85.979 121.183
22.341 85.979 121.183
22.341 85.979 -24.372
PG
4 F
4.062 67.023 -24.372
4.062 67.023 121.183
4.062 85.979 121.183
4.062 85.979 -24.372
PG
3 F
22.341 67.023 -24.372
12.186 76.501 -46.713
22.341 85.979 -24.372
PG
3 F
4.062 67.023 -24.372
12.186 76.501 -46.713
22.341 67.023 -24.372
SG
1
0. -44.005
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PD
3.75 3
FX

```

Figure II.43-1. Piper PA-31T Cheyenne. Data set modeled without propeller for antenna location 6.

E-PHI  
DB PLOT

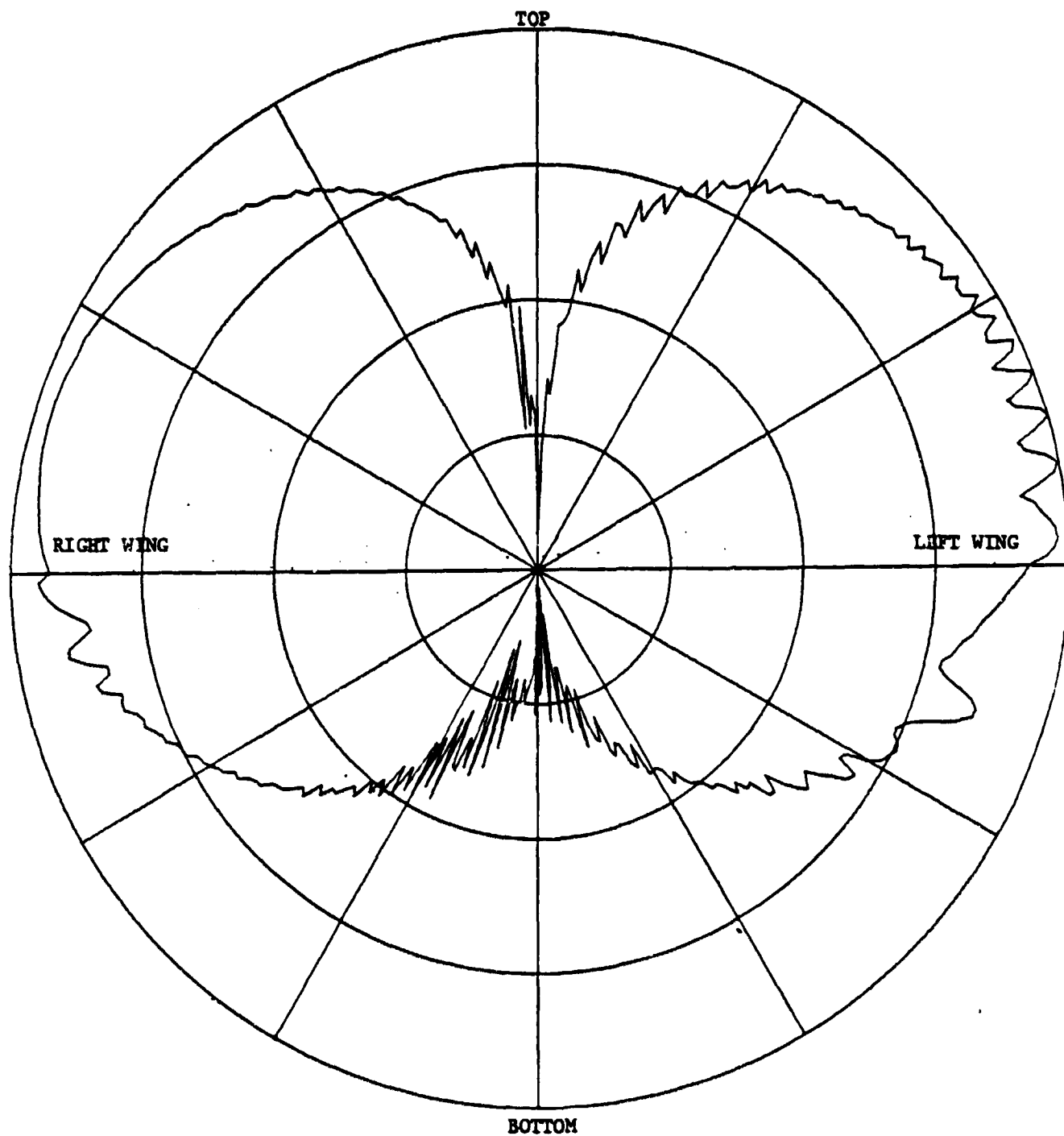


Figure II.43-2. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 6.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
22.46843334672 18.0 14.59171384603 18.0
0. 0. 0.
PG
4 F
4.062 67.023 -24.372
22.341 67.023 -24.372
22.341 67.023 121.183
4.062 67.023 121.183
PG
4 F
22.341 67.023 -24.372
22.341 85.979 -24.372
22.341 85.979 121.183
22.341 67.023 121.183
PG
4 F
4.062 85.979 -24.372
4.062 85.979 121.183
22.341 85.979 121.183
22.341 85.979 -24.372
PG
4 F
4.062 67.023 -24.372
4.062 67.023 121.183
4.062 85.979 121.183
4.062 85.979 -24.372
SG
1
0. -44.005
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3
EX

```

Figure II.44-1. Piper PA-31T Cheyenne. Data set modeled without propeller housing for antenna location 6.

E-PH:  
DB PLOT

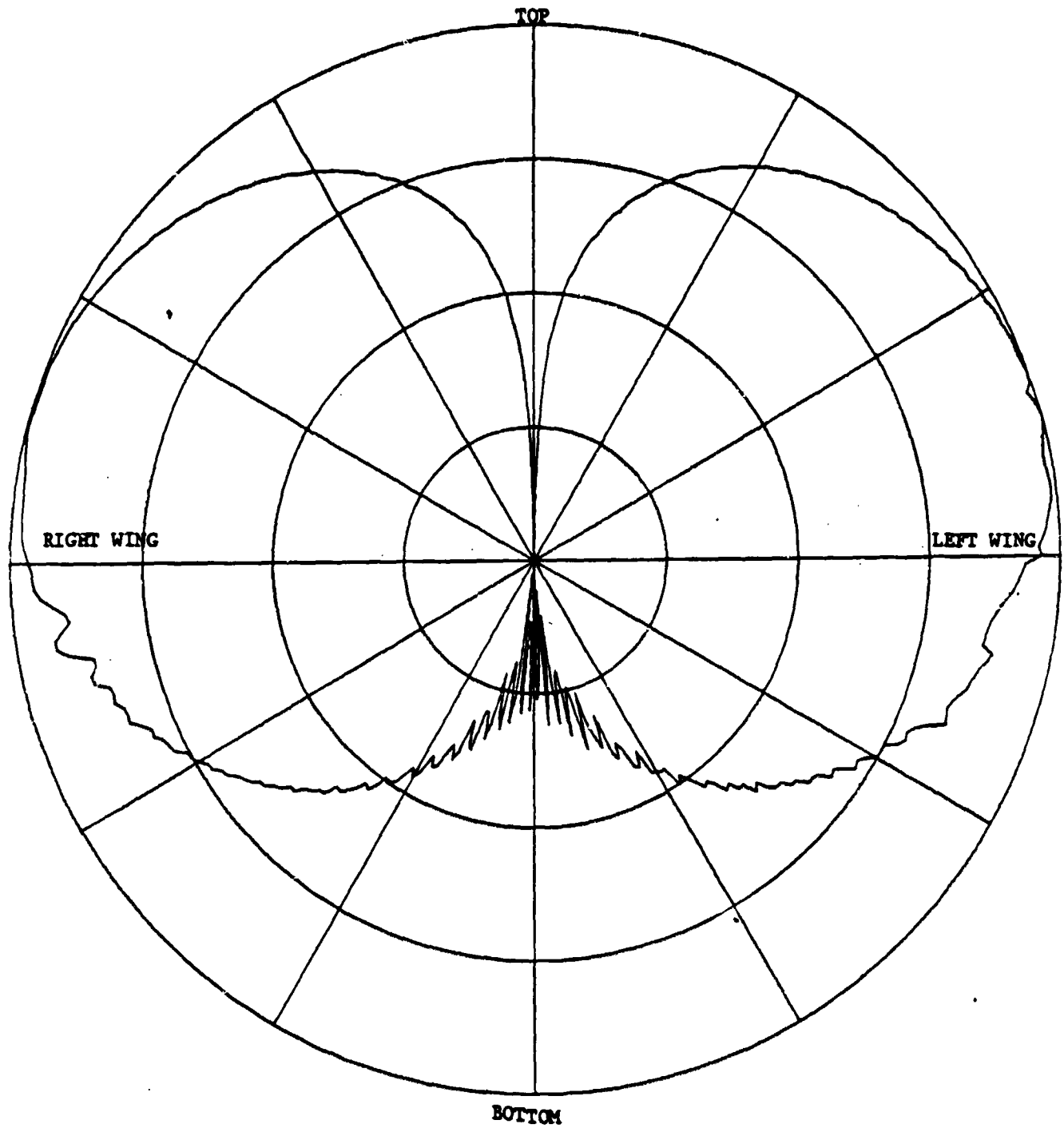


Figure II.44-2. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 6.

ORIGINAL PAGE IS  
OF POOR QUALITY

PG  
22.46843334672 18.0 14.59171384603 18.0  
0. 0. 0.

PG  
4 F  
4.062 67.023 -24.372  
22.341 67.023 -24.372  
22.341 67.023 121.183  
4.062 67.023 121.183

PG  
4 F  
22.341 67.023 -24.372  
22.341 85.979 -24.372  
22.341 85.979 121.183  
22.341 67.023 121.183

PG  
4 F  
4.062 85.979 -24.372  
4.062 85.979 121.183  
22.341 85.979 121.183  
22.341 85.979 -24.372

PG  
4 F  
4.062 67.023 -24.372  
4.062 67.023 121.183  
4.062 85.979 121.183  
4.062 85.979 -24.372

PG  
3 F  
22.341 67.023 -24.372  
12.186 76.501 -46.713  
22.341 85.979 -24.372

PG  
3 F  
4.062 67.023 -24.372  
12.186 76.501 -46.713  
22.341 67.023 -24.372

PG  
4 F  
12.186 33.201 -27.341  
12.186 33.201 -34.527  
12.186 119.801 -34.527  
12.186 119.801 -27.341

SG  
1  
0. -44.005  
0. 0. 0. .25 3  
1. 0.

PD

0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.45-1. Piper PA-31T Cheyenne. Data set for  
antenna location 5.

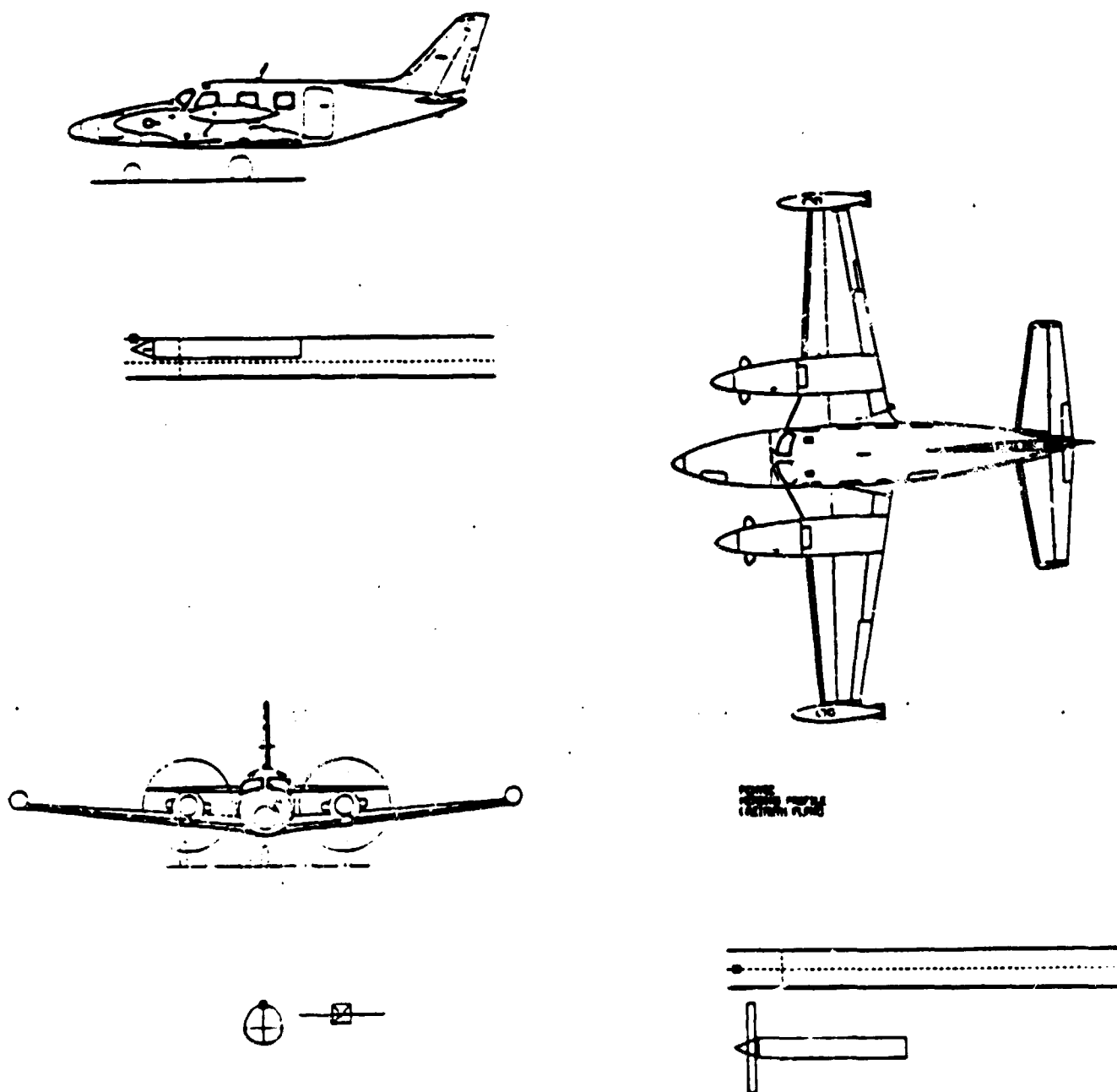


Figure II.45-2. Piper PA-31T Cheyenne. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 6.



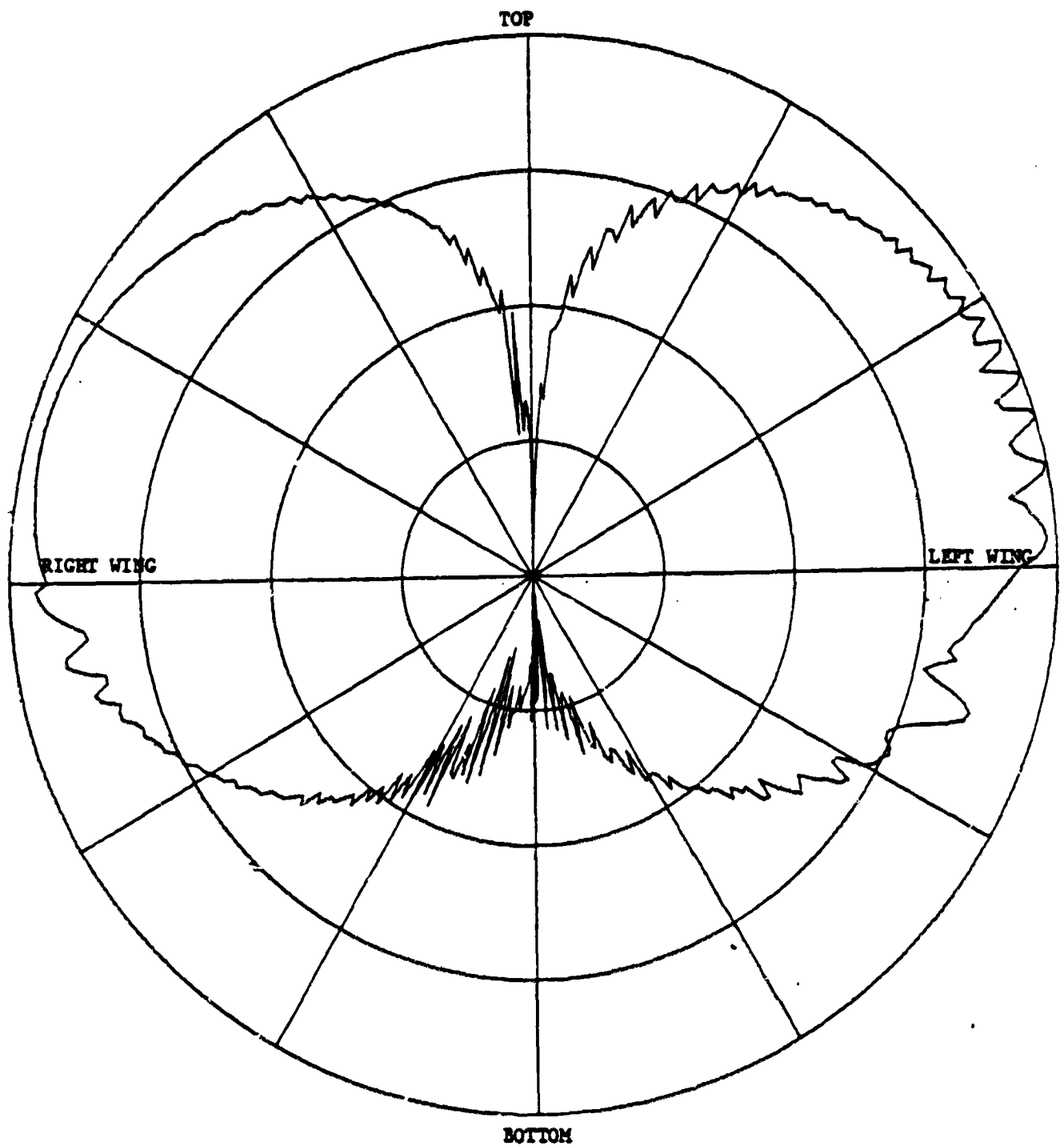


Figure II.45-3. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 6.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG				
	29.0	23.0	23.0	23.0
	0.	0.	0.	
SG				
	1			
	0.	-39.943		
	0.	0.	0.	.25 3
	1.	0.		
PD				
	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP				
	3.75	3		
EX				

Figure II.46-1. Piper PA-31T Cheyenne. Data set for antenna location 7.

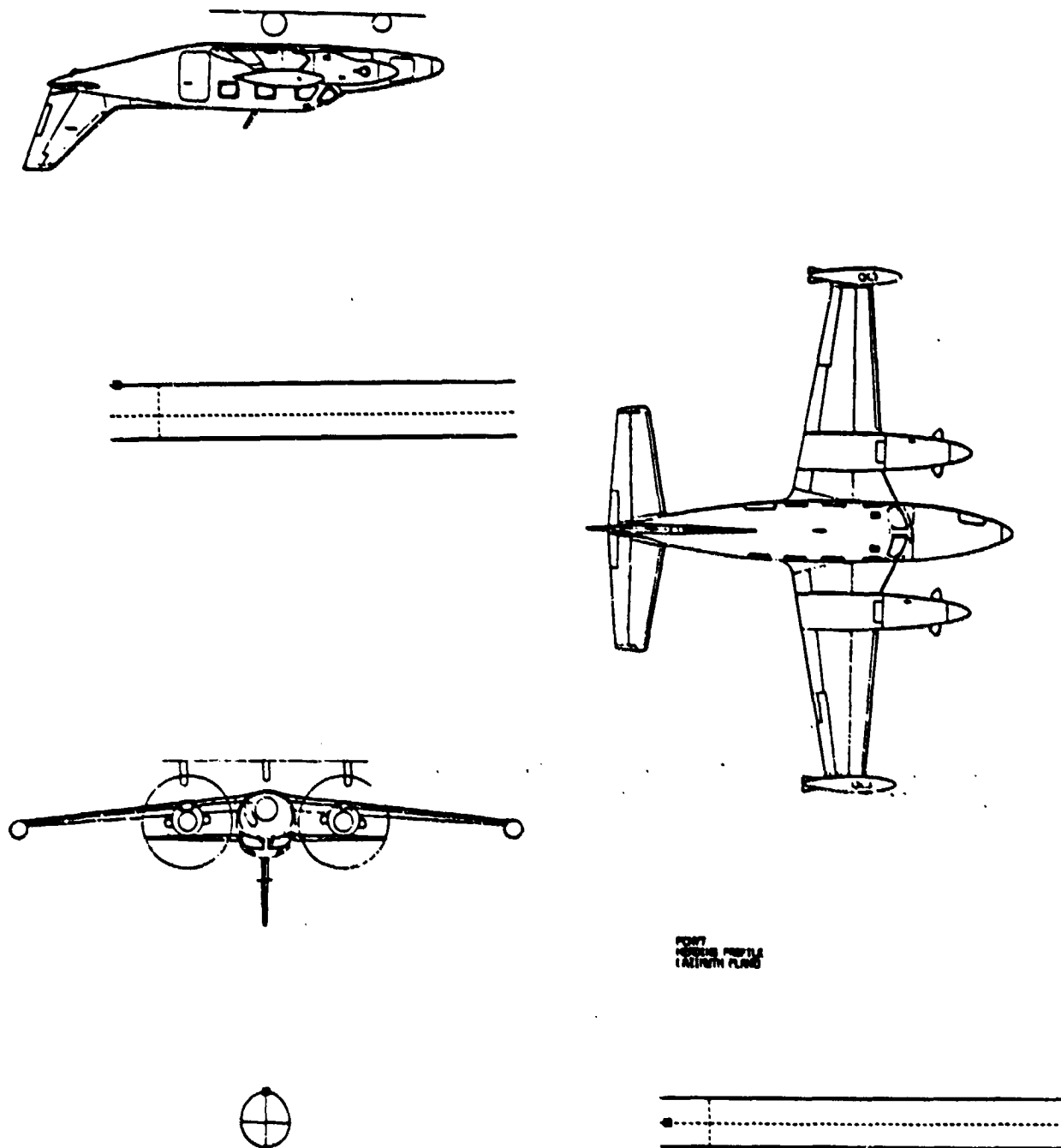


Figure II.46-2. Piper PA-31T Cheyenne. Bottom rear 1/4 wavelength monopole antenna for antenna location 7.

E-PHI  
DB PLOT

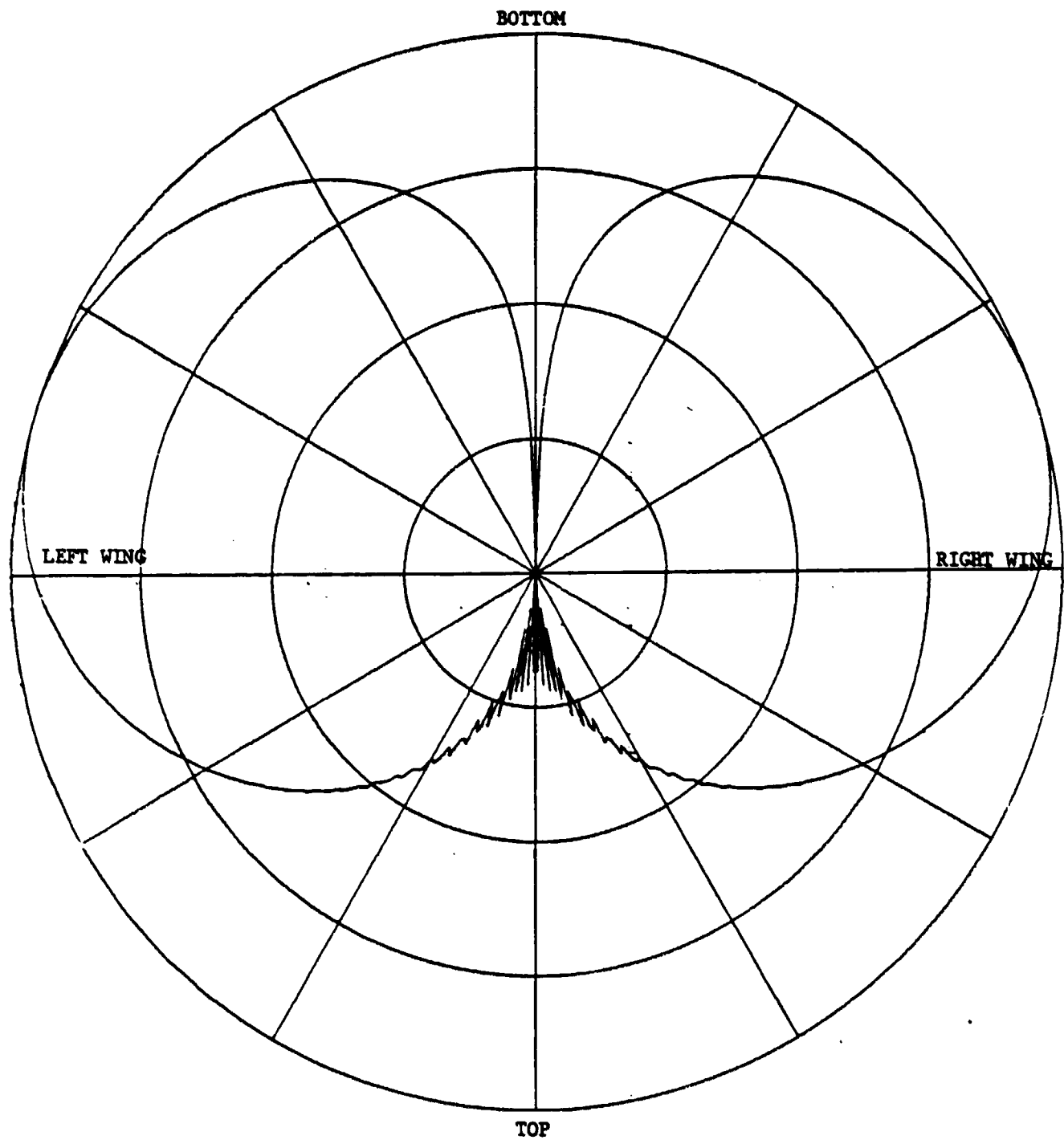


Figure II.46-3. Piper PA-31T Cheyenne. Roll plane pattern for antenna location 7.

#### II.5. Lockheed Jet Star II

Roll plane patterns are calculated for seven particular antenna locations of this aircraft.

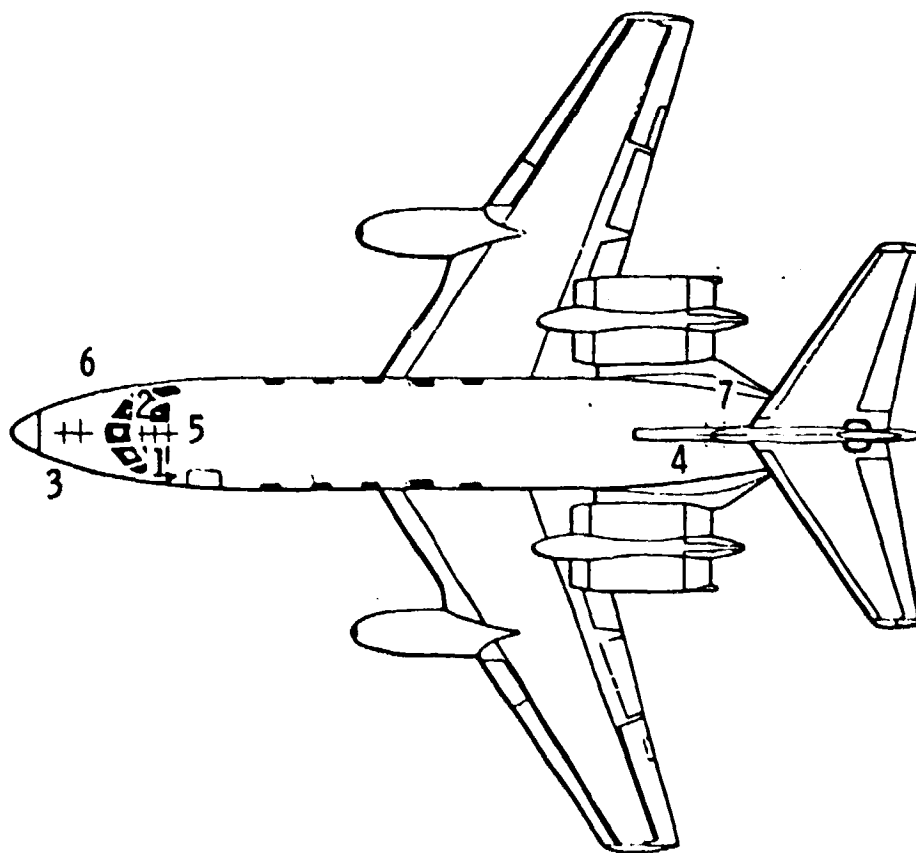
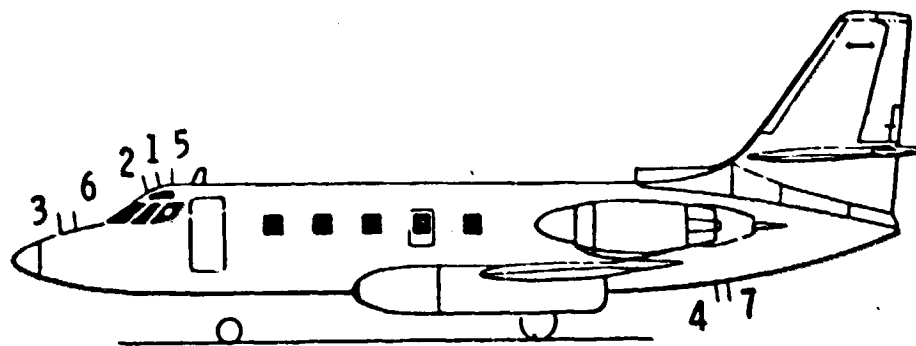
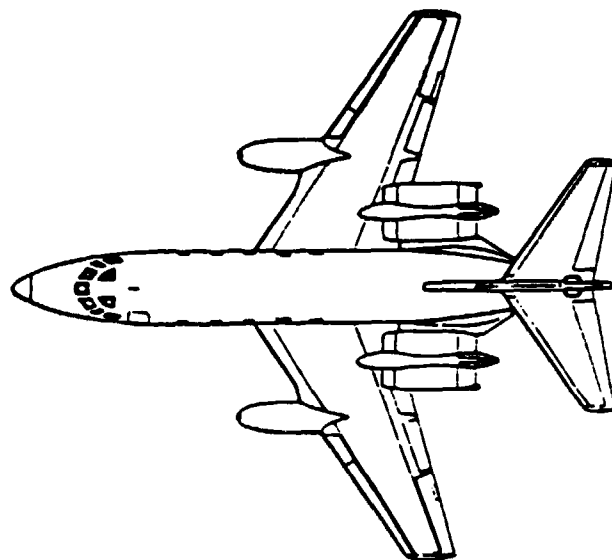
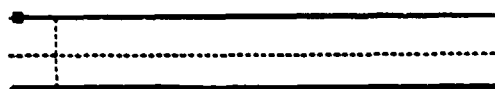
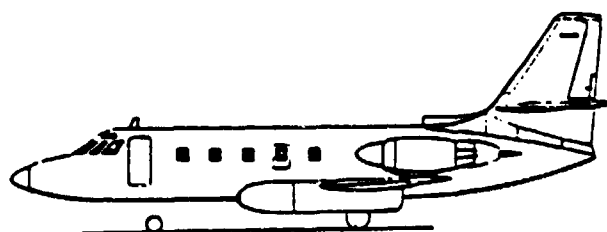


Figure II.47. Lockheed Jet Star II. Antenna locations.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	
	45.0 40.0 40.27 40.0
	0. 0. 0.
PD	
	0. 0. 90.
	0 360 1
	50000. 5.2
SG	
	1
	0.0 -44.235
	0. 0. 0. .25 3
	1. 0.
PP	
	3.75 3
EX	

Figure II.48-1. Lockheed Jet Star II. Data set for antenna location 1.



LOW  
WING PROFILE  
(ANTENNA PLANE)

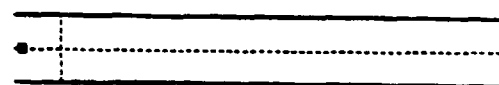
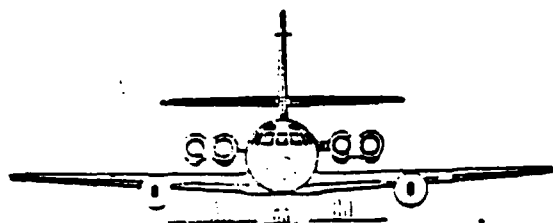


Figure II.48-2. Lockheed Jet Star II. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 1.



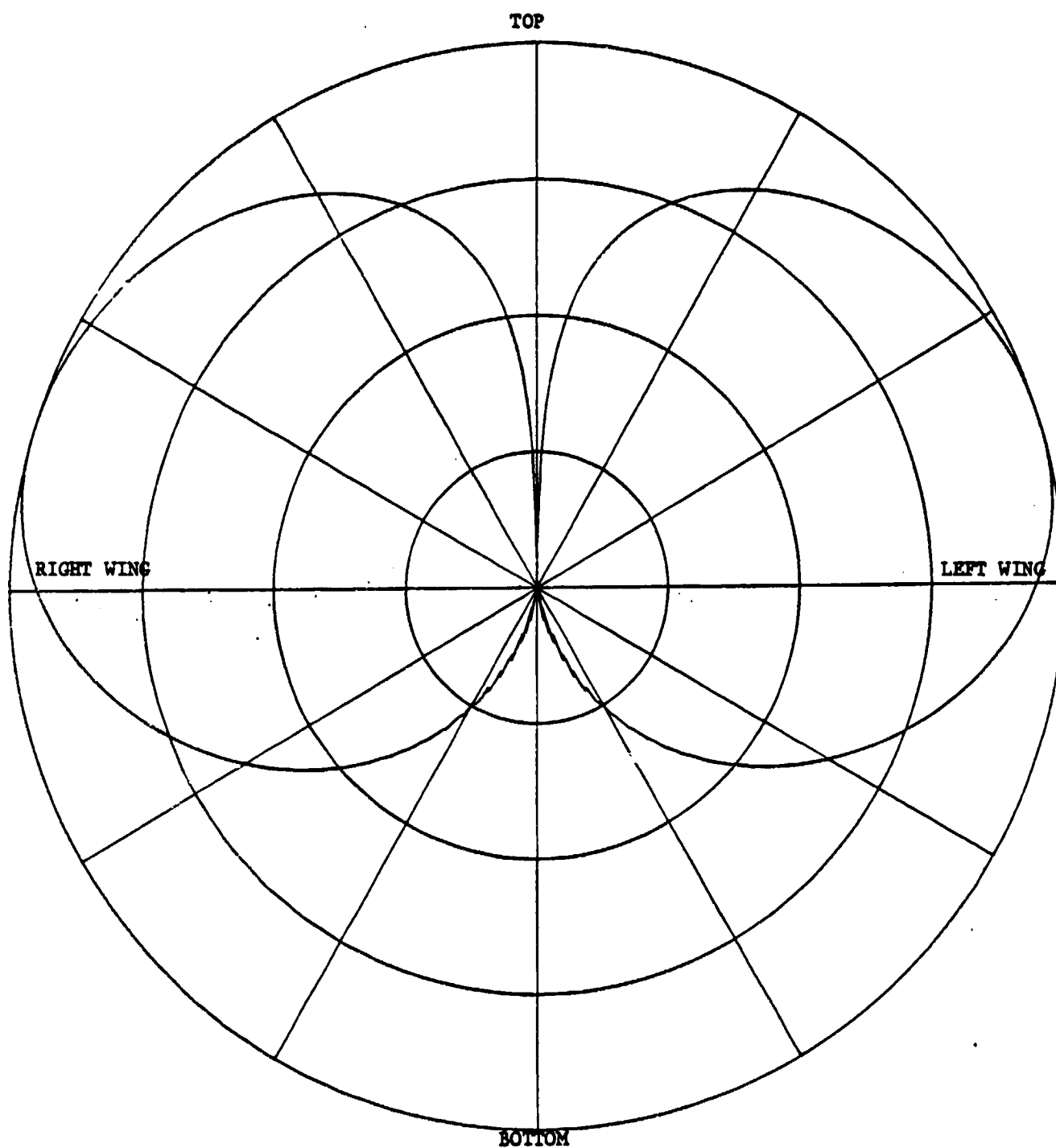
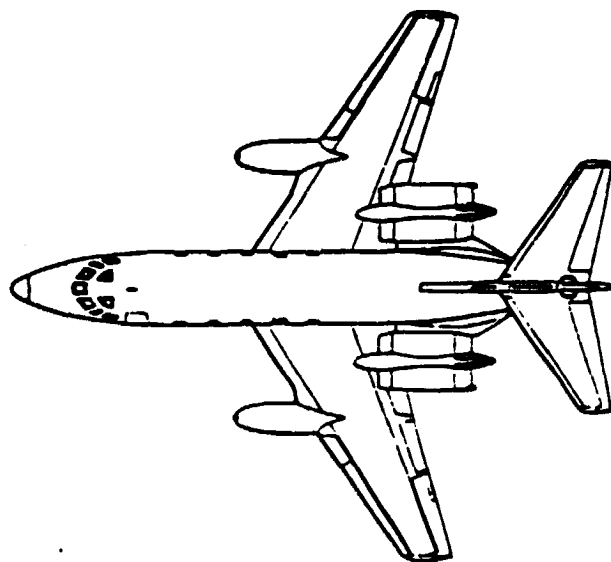
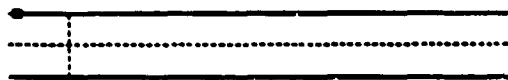
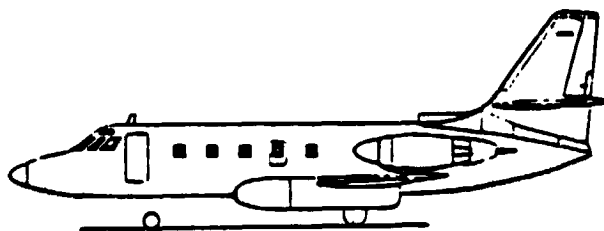


Figure II.48-3. Lockheed Jet Star II. Roll plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

```
FG
35.8048827567 38.0 39.07011205066 38.0
0. 0. 0.
SG
1
0. -61.929
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3
EX
```

Figure II.49-1. Lockheed Jet Star II. Data set for antenna location 2.



LOCKHEED JET STAR II  
TWO ENGINE LOW WING  
T-TAIL PLANE

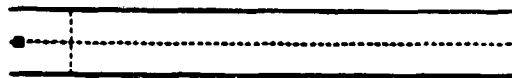
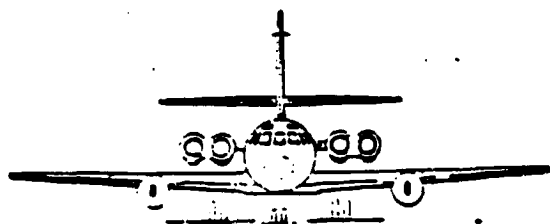


Figure II.49-2. Lockheed Jet Star II. Top front  $1/4$  wavelength monopole antenna above cockpit for antenna location 2.

E-PHI  
DB PLOT

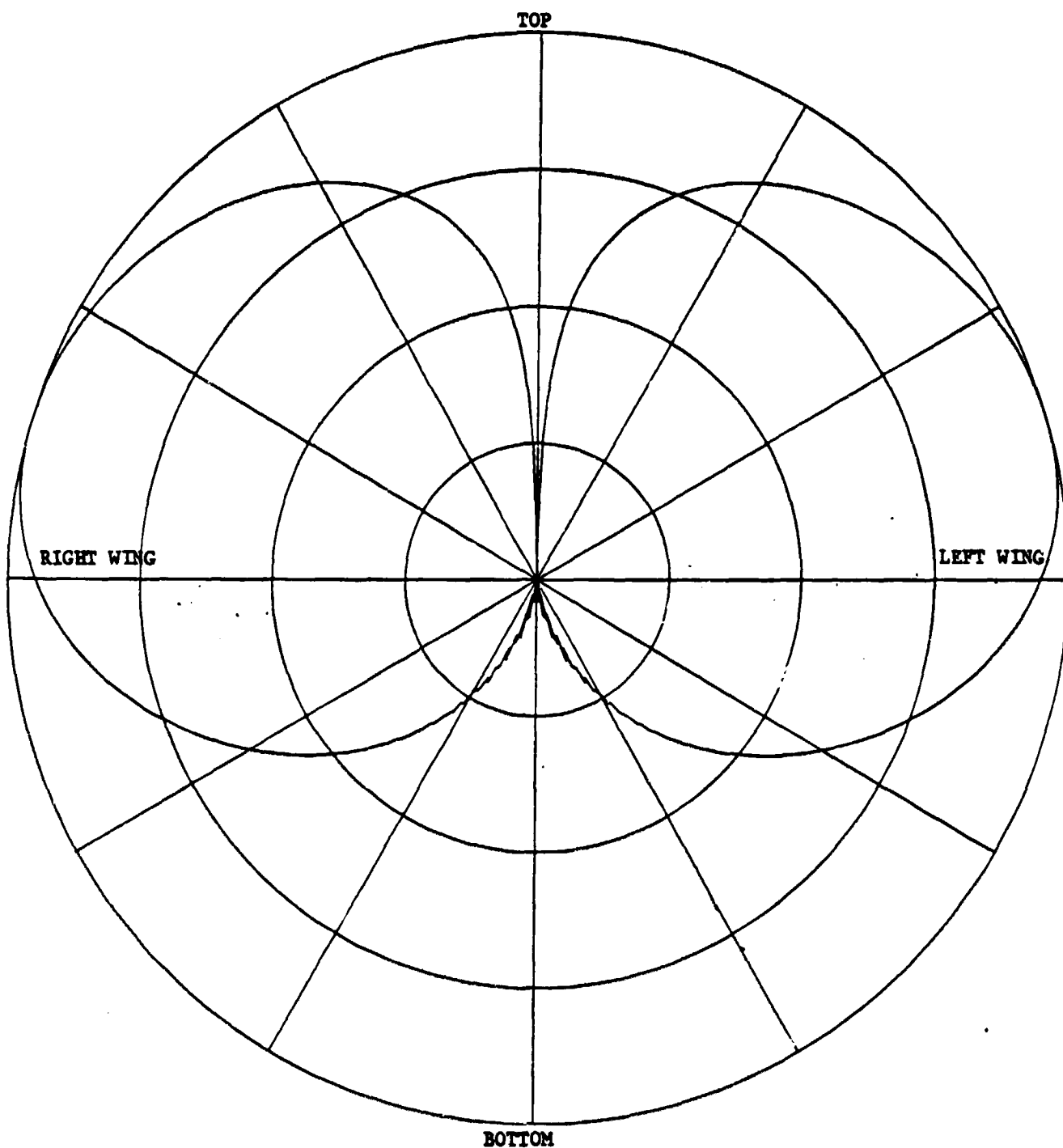
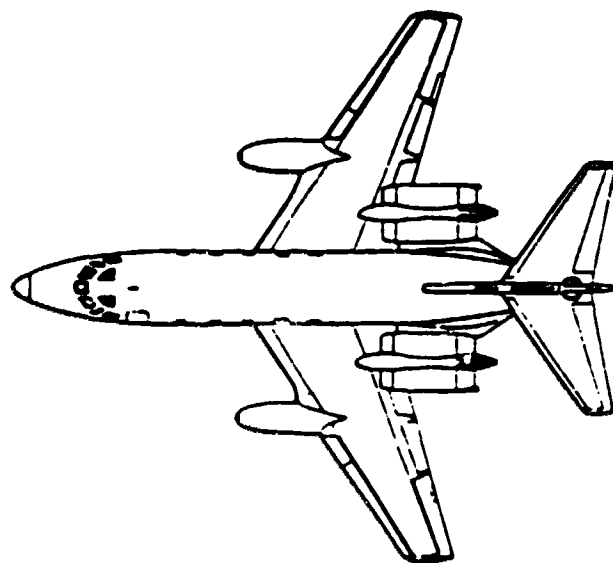
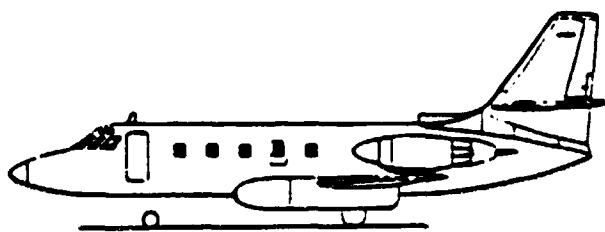


Figure II.49-3. Lockheed Jet Star II. Roll plane pattern for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

```
FG
20.52950551407 24.0 17.89056960238 24.0
0. 0. 0.
SG
1
0. -128.773
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3
EX
```

Figure II.50-1. Lockheed Jet Star II. Data set for antenna location 3.



1/4 WAVELENGTH  
MONOPOLE ANTENNA

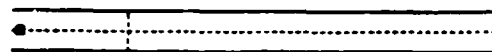
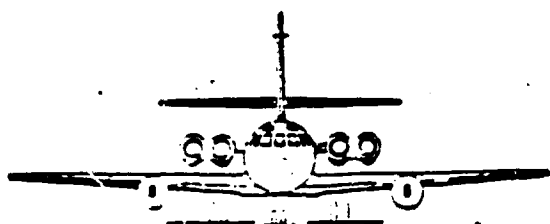


Figure II.50-2. Lockheed Jet Star II. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 3.

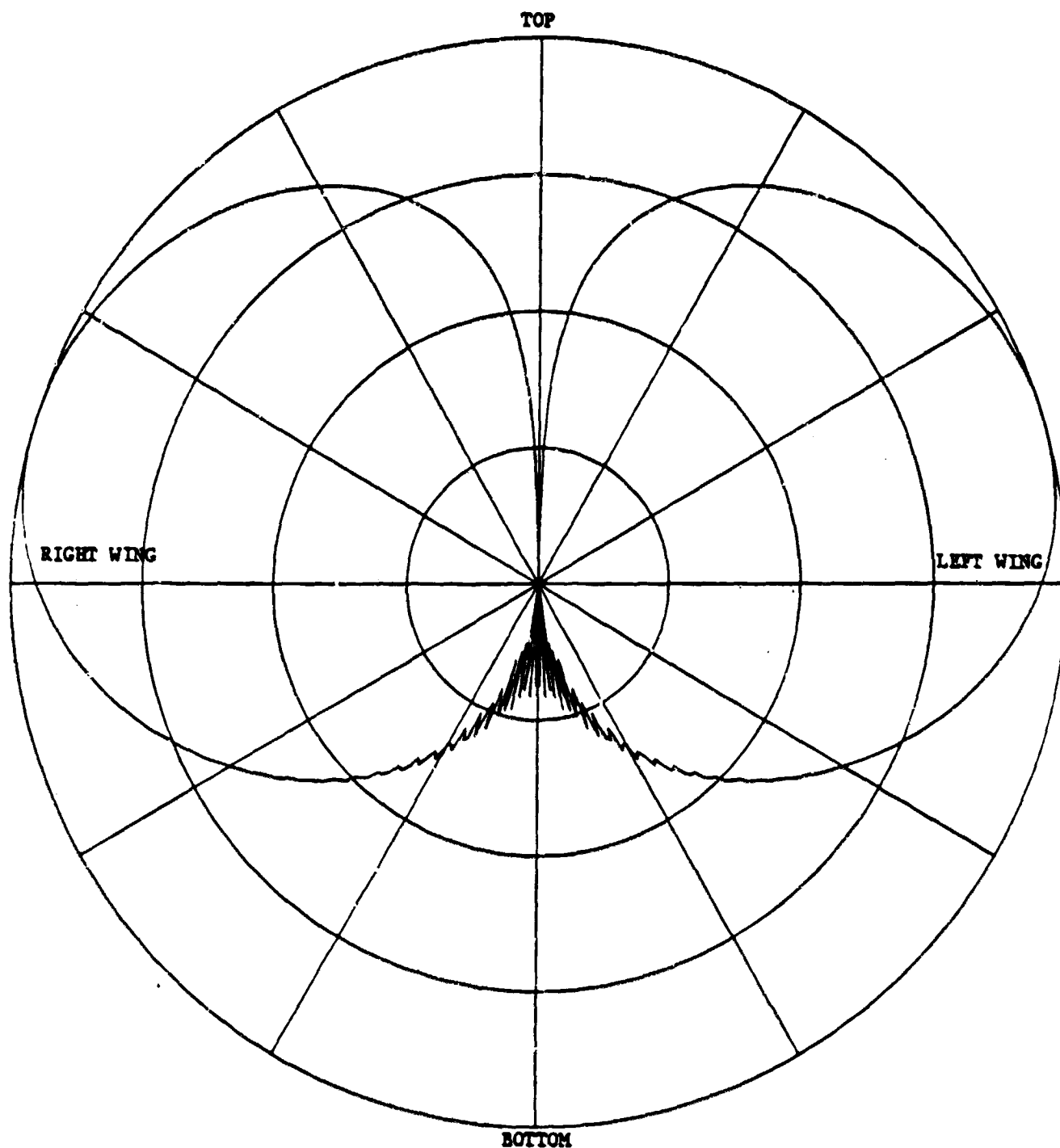


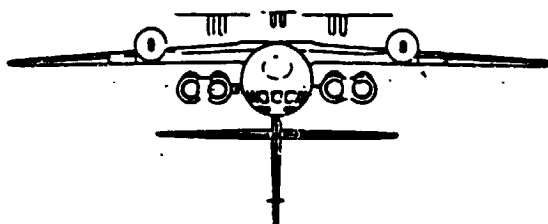
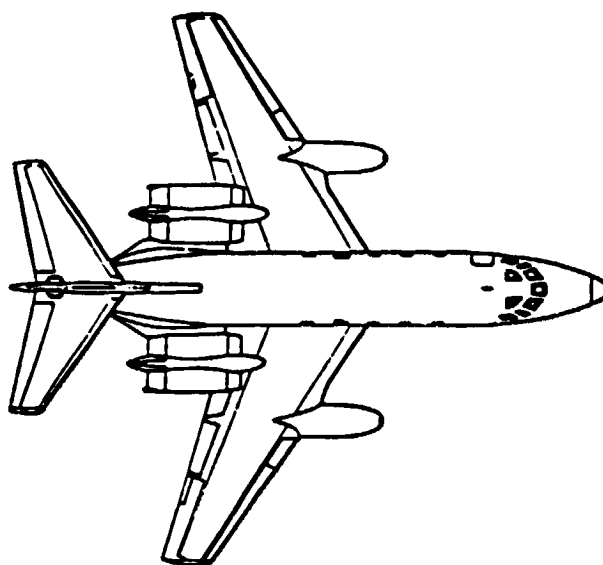
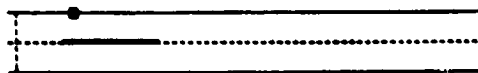
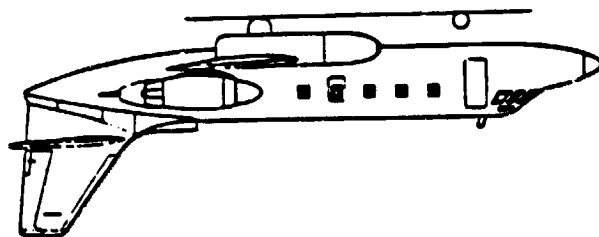
Figure II.50-3. Lockheed Jet Star II. Roll plane pattern for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
34.3 36.37 34.3 36.37  
0. 0. 0.  
PG  
4 T  
2.949 32.0 54.5  
0. 116.977 54.5  
0. 116.977 170.0  
2.949 32.0 170.0  
PG  
4 T  
2.949 -32.0 170.0  
0. -116.977 170.0  
0. -116.977 54.5  
2.949 -32.0 54.5  
SG  
1  
0.0 66.844  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure 11.51-1. Lockheed Jet Star II. Data set for antenna location 4.





LOW  
PRESSURE PROFILE  
(AZIMUTH PLANE)

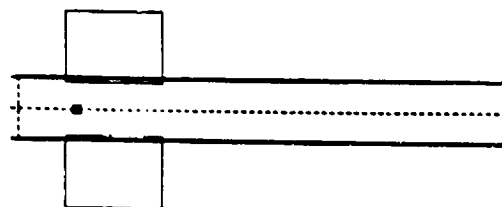


Figure II.51-2. Lockheed Jet Star II. Bottom rear  $1/4$  wavelength monopole antenna for antenna location 4.

E-PHI  
DB PLOT

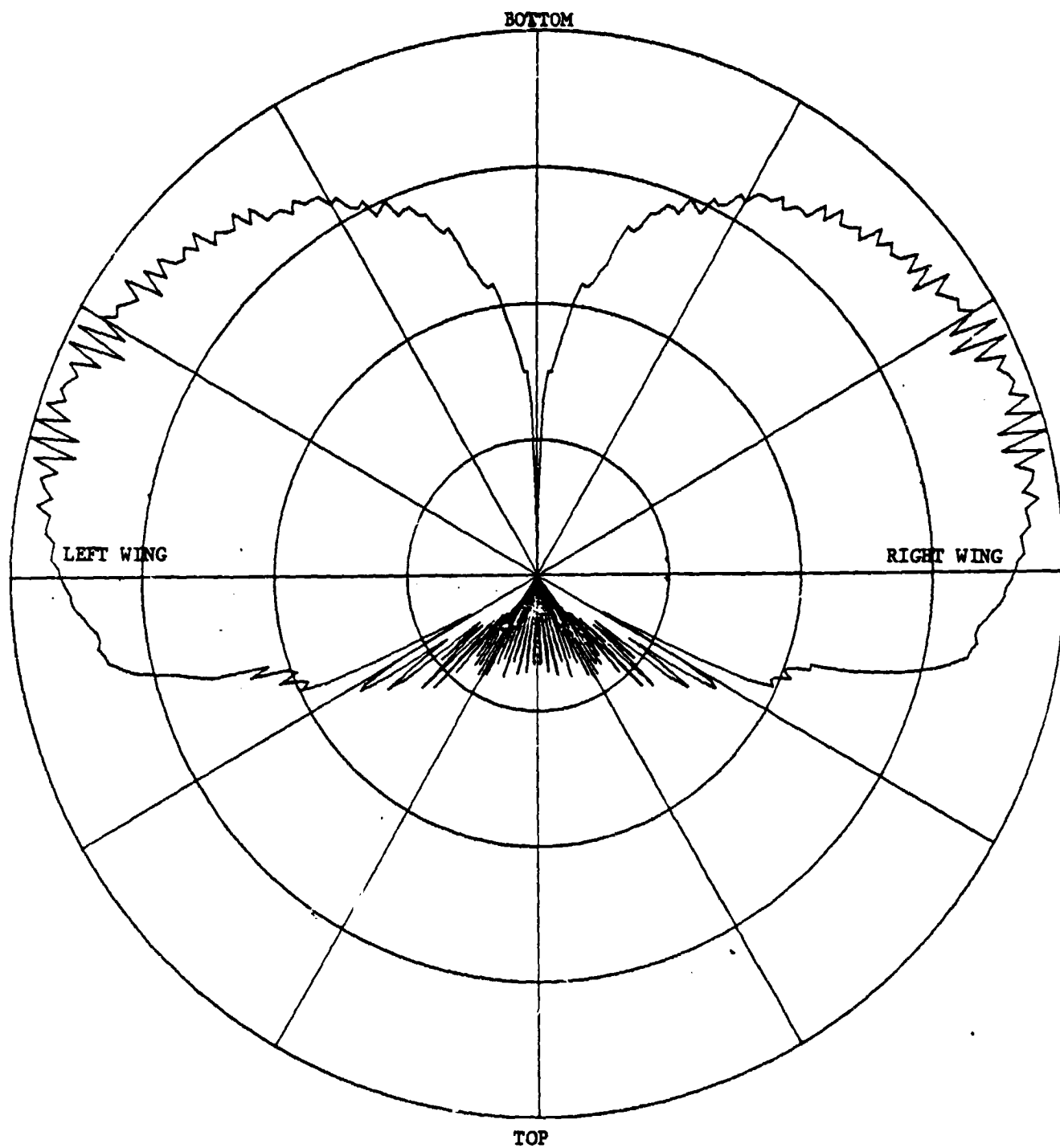
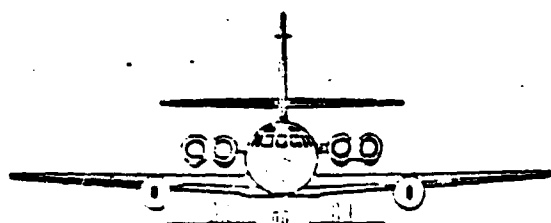
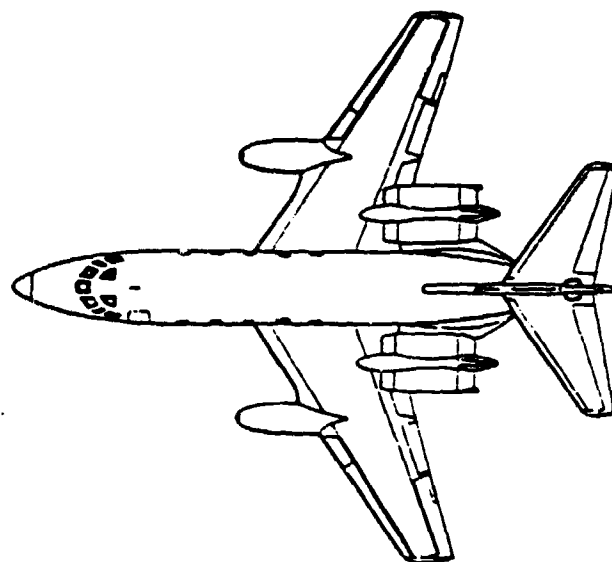
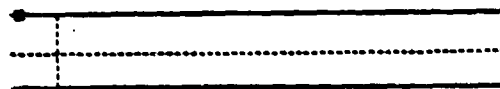
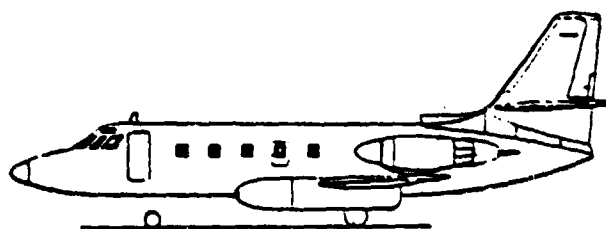


Figure II.51-3. Lockheed Jet Star II. Roll plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

```
FG
45.0 40.0 41.0 40.0
0. 0. 0.
PD
0. 0. 90.
0 360 1
50000, 5.2
SG
1
0.0 -44.235
0. 0. 0. .25 3
1. 0.
PP
3.75 3
EX
```

Figure II.52-1. Lockheed Jet Star II. Data set for antenna location 5.



LOS  
LOSING PROFILE  
(RETRON PLANE)

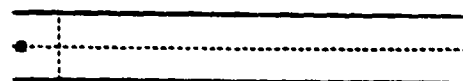


Figure II.52-2. Lockheed Jet Star II. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 5.

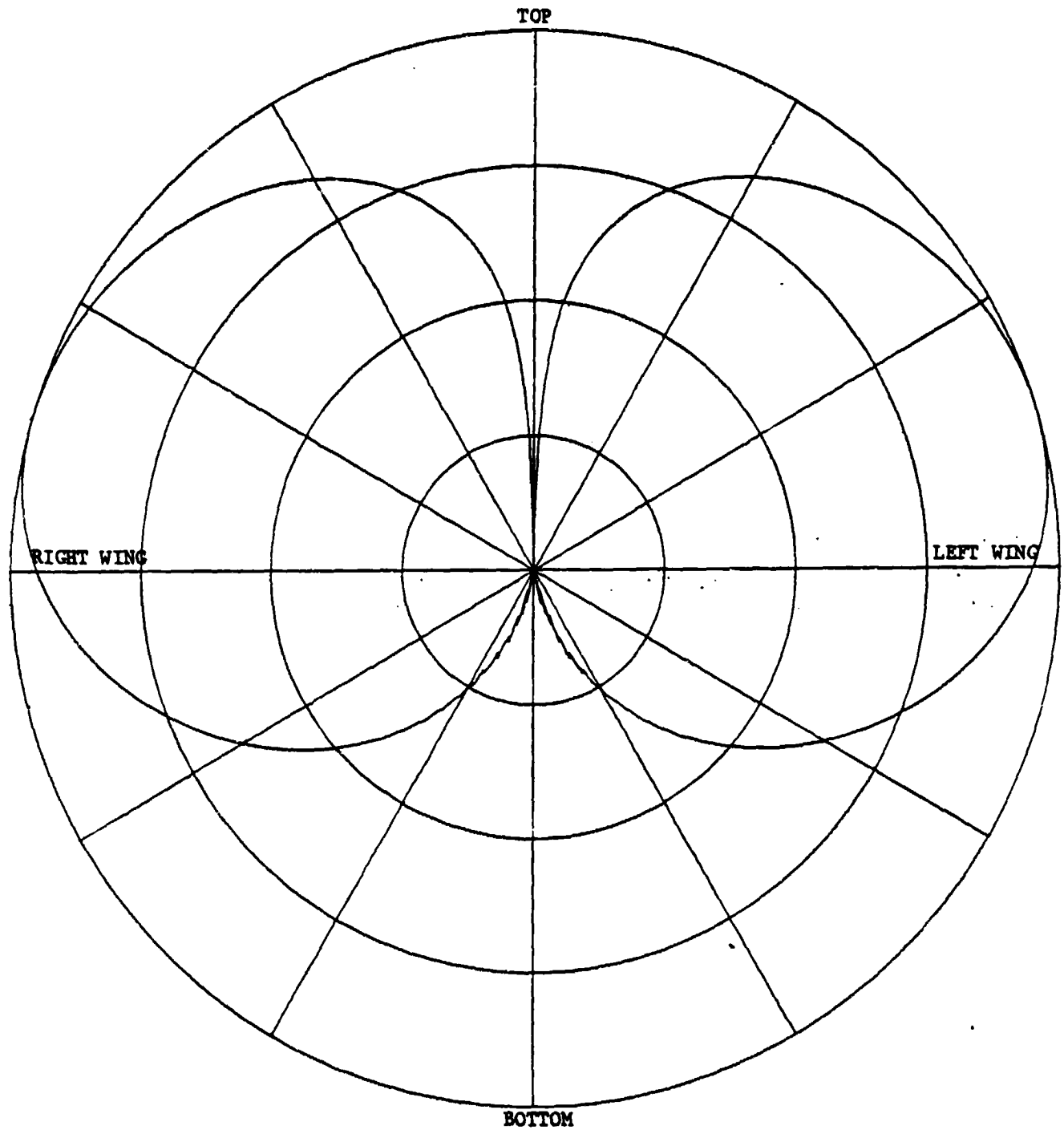
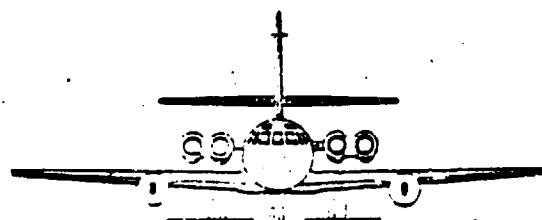
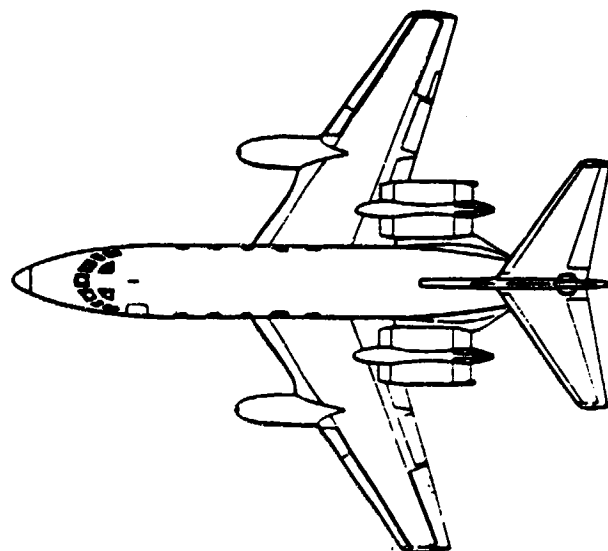
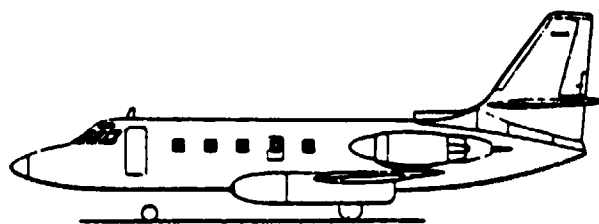


Figure II.52-3. Lockheed Jet Star II. Roll plane pattern for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

```
FG
21.52950551407 25.0 19.89056960238 25.0
0. 0. 0.
SG
1
0. -128.773
0. 0. 0. 25.3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3
EX
```

Figure II.53-1. Lockheed Jet Star II. Data set for antenna location 6.



LOC  
POSITION PROFILE  
(AZIMUTH PLANE)

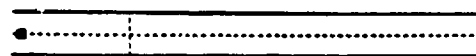


Figure II.53-2. Lockheed Jet Star II. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 6.

E-PHI  
DB PLOT

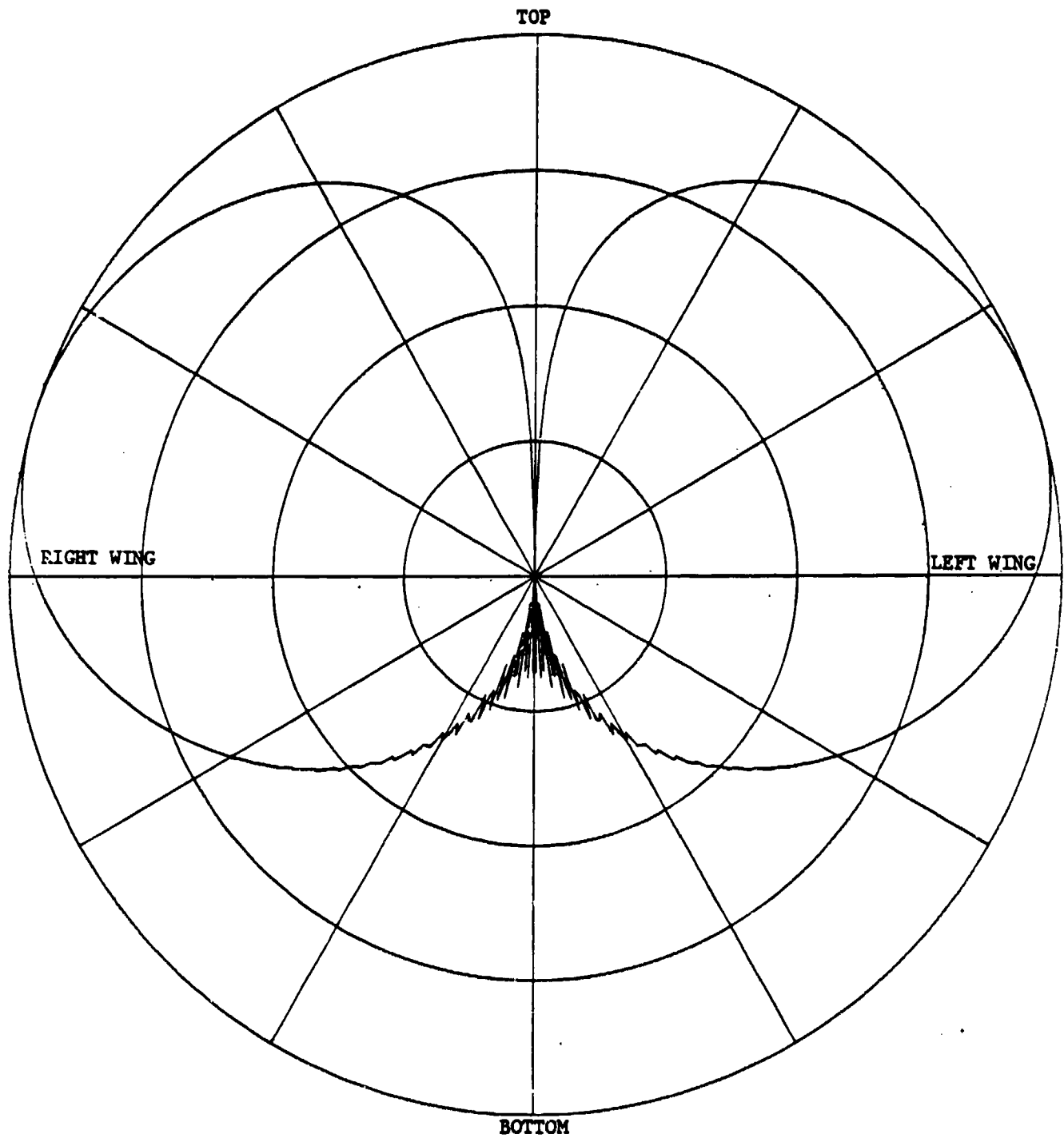


Figure II.53-3. Lockheed Jet Star II. Roll plane pattern for antenna location 6.



ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
34.3 36.37 34.3 36.37
0. 0. 0.
PG
4 T
2.949 32.0 54.5
0. 116.977 54.5
0. 116.977 170.0
2.949 32.0 170.0
PG
4 T
2.949 -32.0 170.0
0. -116.977 170.0
0. -116.977 54.5
2.949 -32.0 54.5
SG
1
0.0 51.0
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3
FX

```

Figure II.54-1. Lockheed Jet Star II. Data set for antenna location 7.

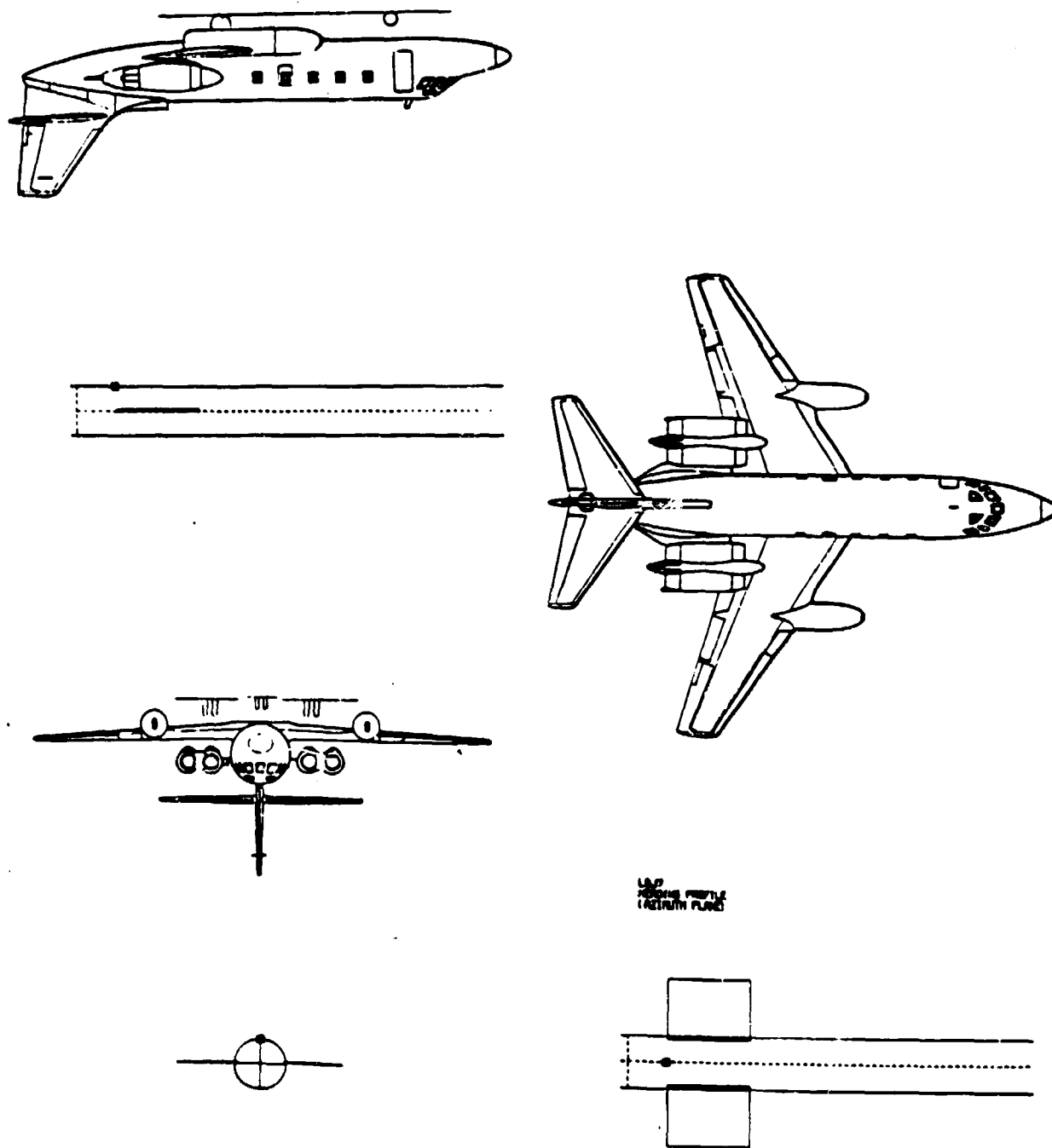


Figure II.54-2. Lockheed Jet Star II. Bottom rear  $1/4$  wavelength monopole antenna for antenna location 7.

E-PHI  
DB PLOT

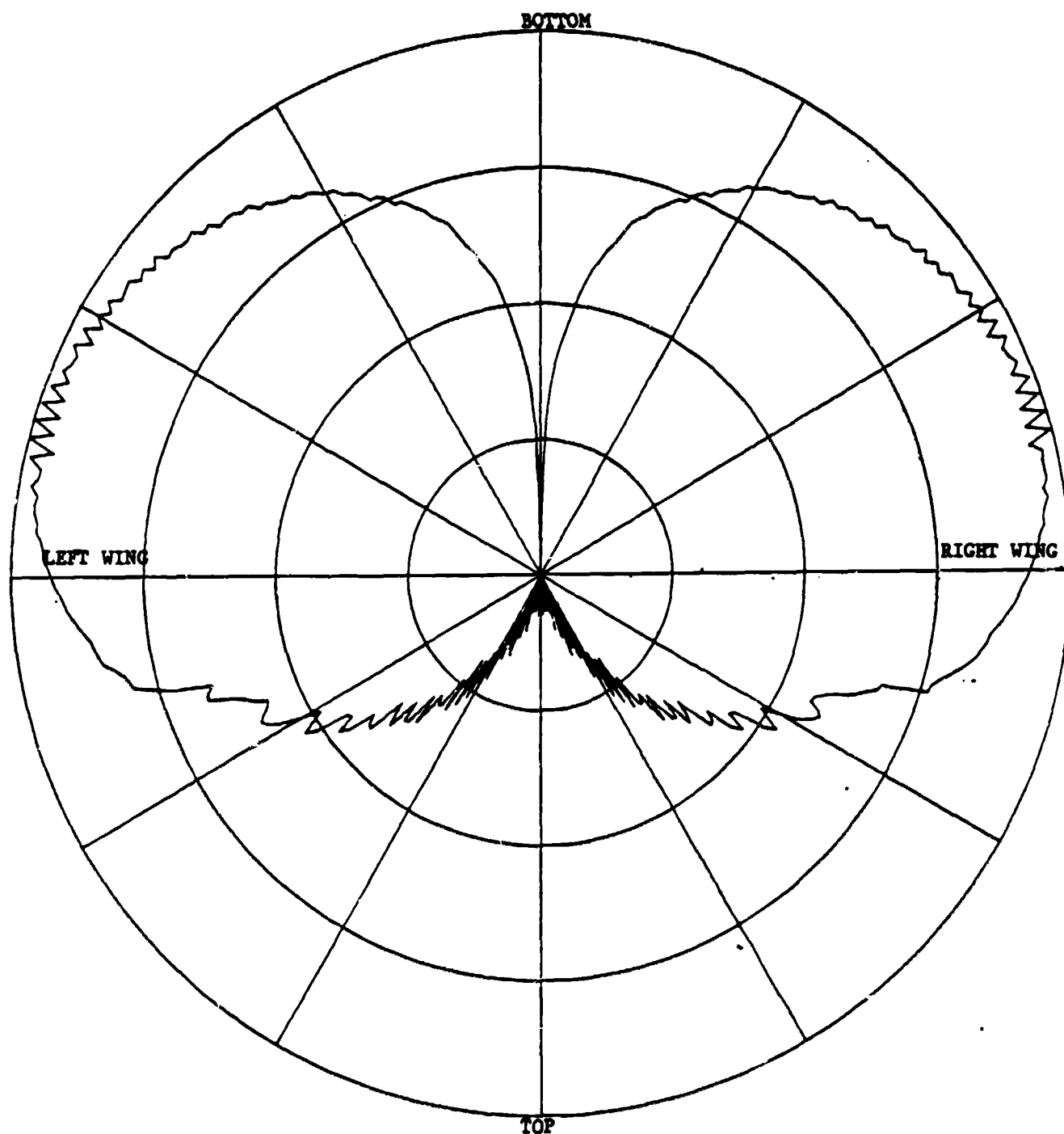


Figure II.54-3. Lockheed Jet Star II. Roll plane pattern for antenna location 7.

#### II.6. Piper PA-31-350 Navajo Chieftain

Roll plane patterns are calculated for seven particular antenna locations of this aircraft. Various modeling attempts are made for some antenna locations.

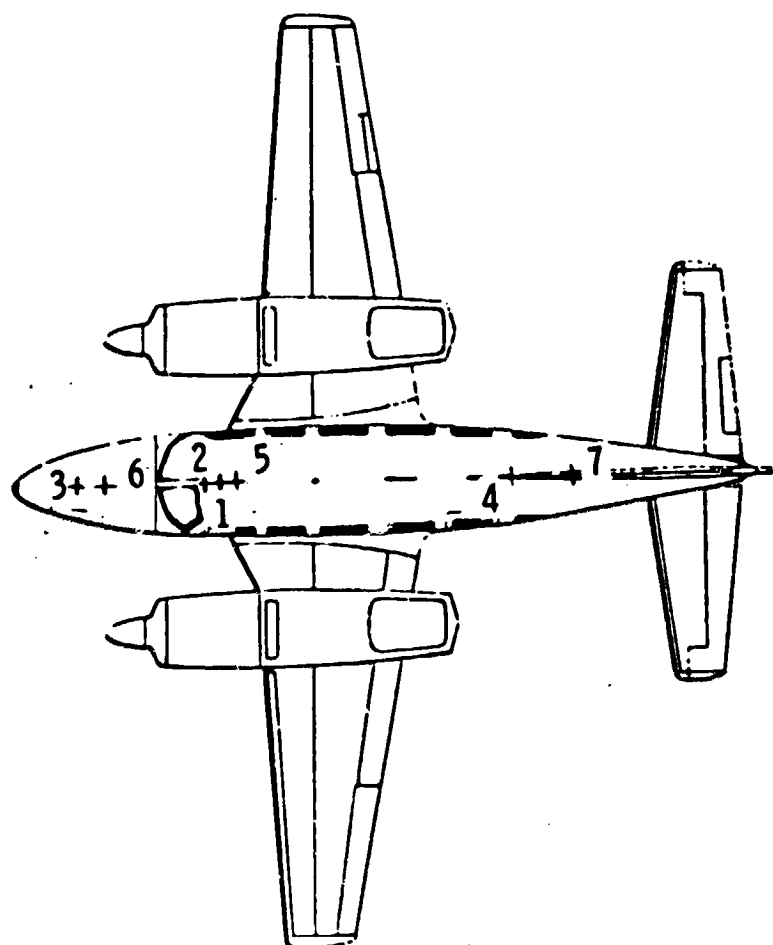
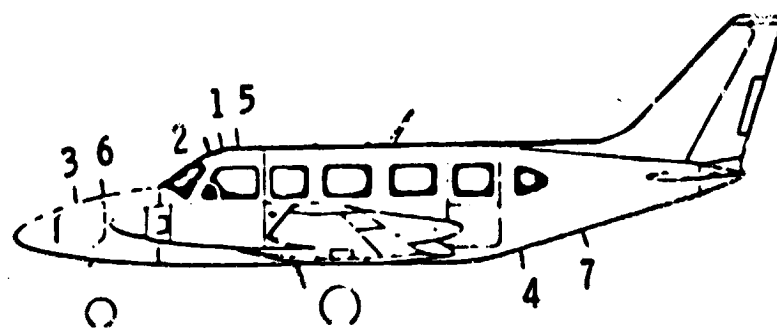


Figure II.55. Piper PA-31-350 Navajo Chieftain. Antenna locations.

ORIGINAL PAGE IS  
OF POOR QUALITY

21.619 28.645 31.558 28.645  
0. 0. 0.

PG

4 T

-21.248 20.0 -27.888  
-16.6 57.104 -8.632  
-16.6 57.104 75.032  
-21.248 20.0 82.336

PG

6 F

-16.6 57.104 -8.632  
-16.6 57.104 -63.08  
.664 55.112 -63.08  
.664 55.112 95.616  
-16.6 57.104 95.616  
-16.6 57.104 75.032

PG

4 F

.664 55.112 -63.08  
3.984 96.28 -63.08  
3.984 96.28 95.616  
.664 55.112 95.616

PG

6 F

-13.28 97.608 67.728  
-13.28 97.608 95.616  
3.984 96.28 95.616  
3.984 96.28 -63.08  
-13.28 97.608 -63.08  
-13.28 97.608 -5.976

PG

4 F

-13.28 97.608 -5.976  
-1.328 237.048 4.648  
-1.328 237.048 40.504  
-13.28 97.608 67.728

PG

4 T

-21.248 -20.0 82.336  
-16.6 -57.104 75.032  
-16.6 -57.104 -8.632  
-21.248 -20.0 -27.888

PG

6 F

-16.6 -57.104 75.032  
-16.6 -57.104 95.616  
.664 -55.112 95.616  
.664 -55.112 -63.08

-16.6 -57.104 -63.08  
-16.6 -57.104 -8.632

PG

4 F

.664 -55.112 95.616  
3.984 -96.28 95.616  
3.984 -96.28 -63.08  
.664 -55.112 -63.08

PG

6 F

-13.28 -97.608 -5.976  
-13.28 -97.608 -63.08  
3.984 -96.28 -63.08  
3.984 -96.28 95.616  
-13.28 -97.608 95.616  
-13.28 -97.608 67.728

PG

4 F

-13.28 -97.608 67.728  
-1.328 -237.048 40.504  
-1.328 -237.048 4.648  
-13.28 -97.608 -5.976

SG

1

0. -30.544  
0. 0. 0. .25 3  
1. 0.

PD

0. 0. 90.  
0 360 1  
50000. 5.2

PP

3.75 3

EX

Figure II.56-1. Piper PA-31-350 Navajo Chieftain. Data set for antenna location 1.

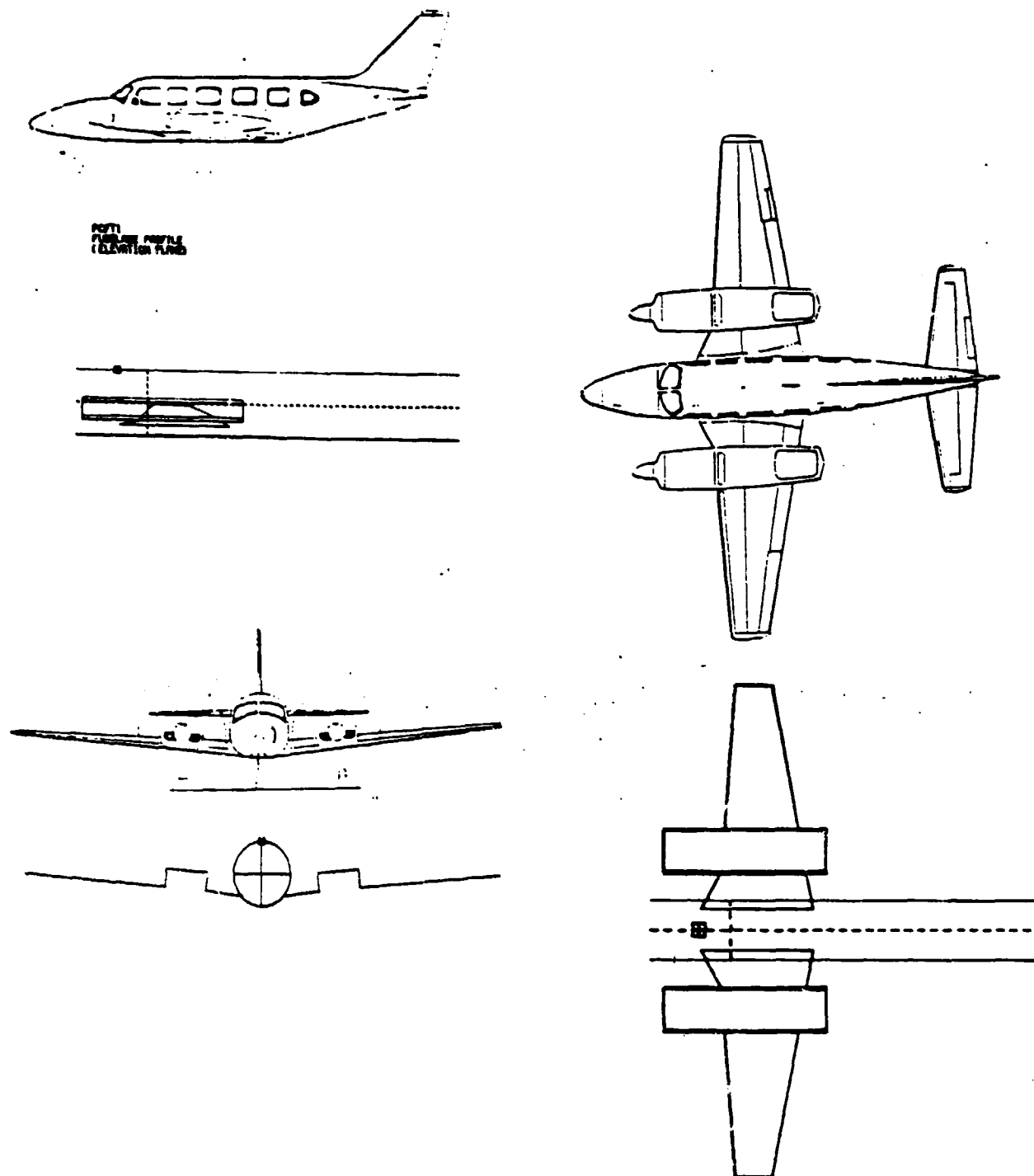


Figure II.56-2. Piper PA-31-350 Navajo Chieftain. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 1.

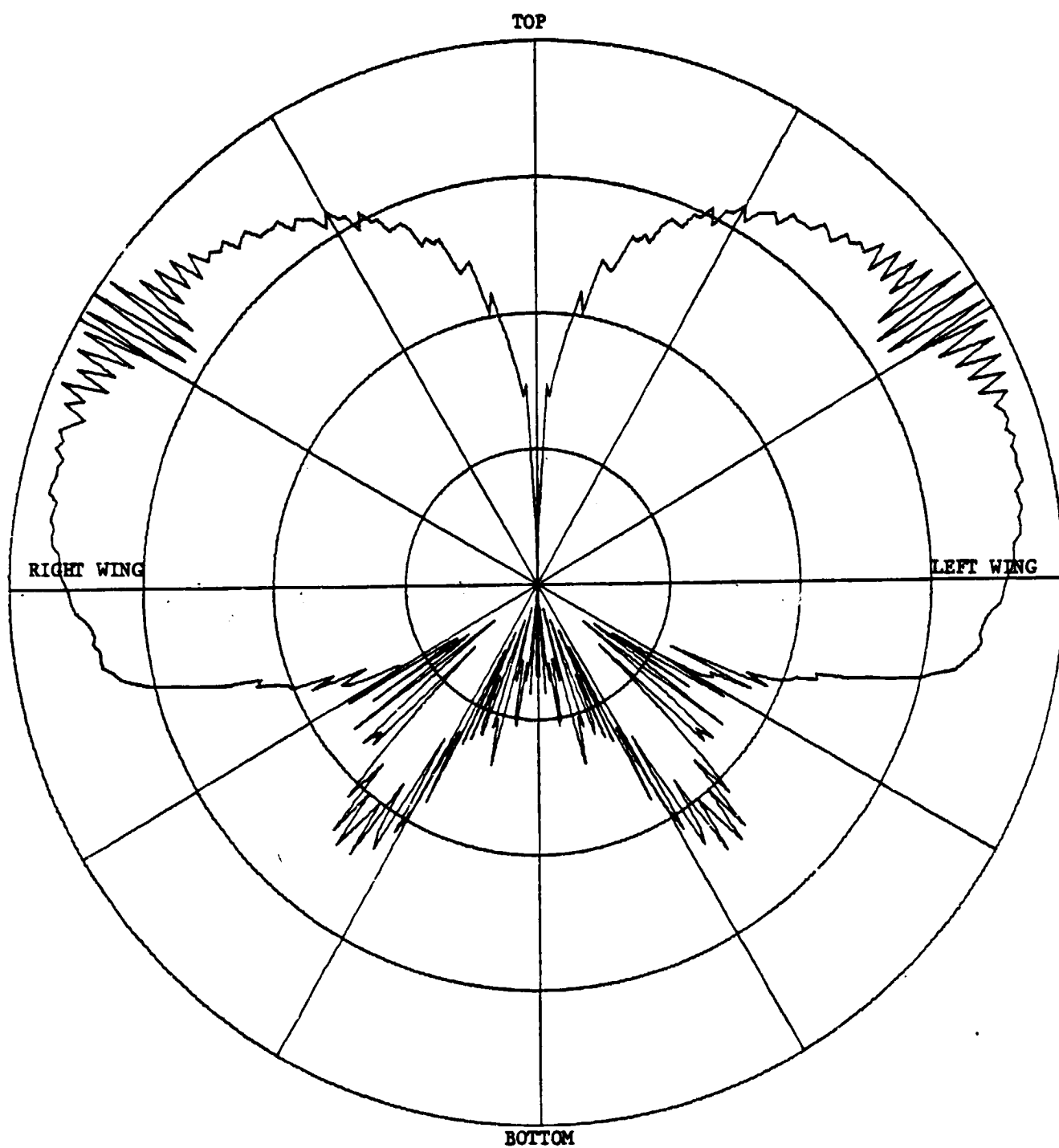


Figure II.56-3. Piper PA-31-350 Navajo Chieftain. Roll plane pattern for antenna location 1.



ORIGINAL PAGE IS  
OF POOR QUALITY

```

PG
21.612 28.645 31.558 28.649
0. 0. 0.
PG
4 T
-21.248 20.0 -27.888
-16.6 57.104 -8.632
-16.6 57.104 75.032
-21.248 20.0 82.336
PG
6 F
-16.6 57.104 -8.632
-16.6 57.104 -63.08
.664 55.112 -63.08
.664 55.112 95.616
-16.6 57.104 95.616
-16.6 57.104 75.032
PG
4 F
.664 55.112 -63.08
3.984 96.28 -63.08
3.984 96.28 95.616
.664 55.112 95.616
PG
6 F
-13.28 97.608 67.728
-13.28 97.608 95.616
3.984 96.28 95.616
3.984 96.28 -63.08
-13.28 97.608 -63.08
-13.28 97.608 -5.976
PG
4 F
-13.28 97.608 -5.976
-1.328 237.048 4.648
-1.328 237.048 40.504
-13.28 97.608 67.728
SG
1
0. -30.544
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PD
3.75 3
FY

```

Figure II.57-1. Piper PA-31-350 Navajo Chieftain. Data set with only one wing for antenna location 1.

E-PHI  
DB PLOT

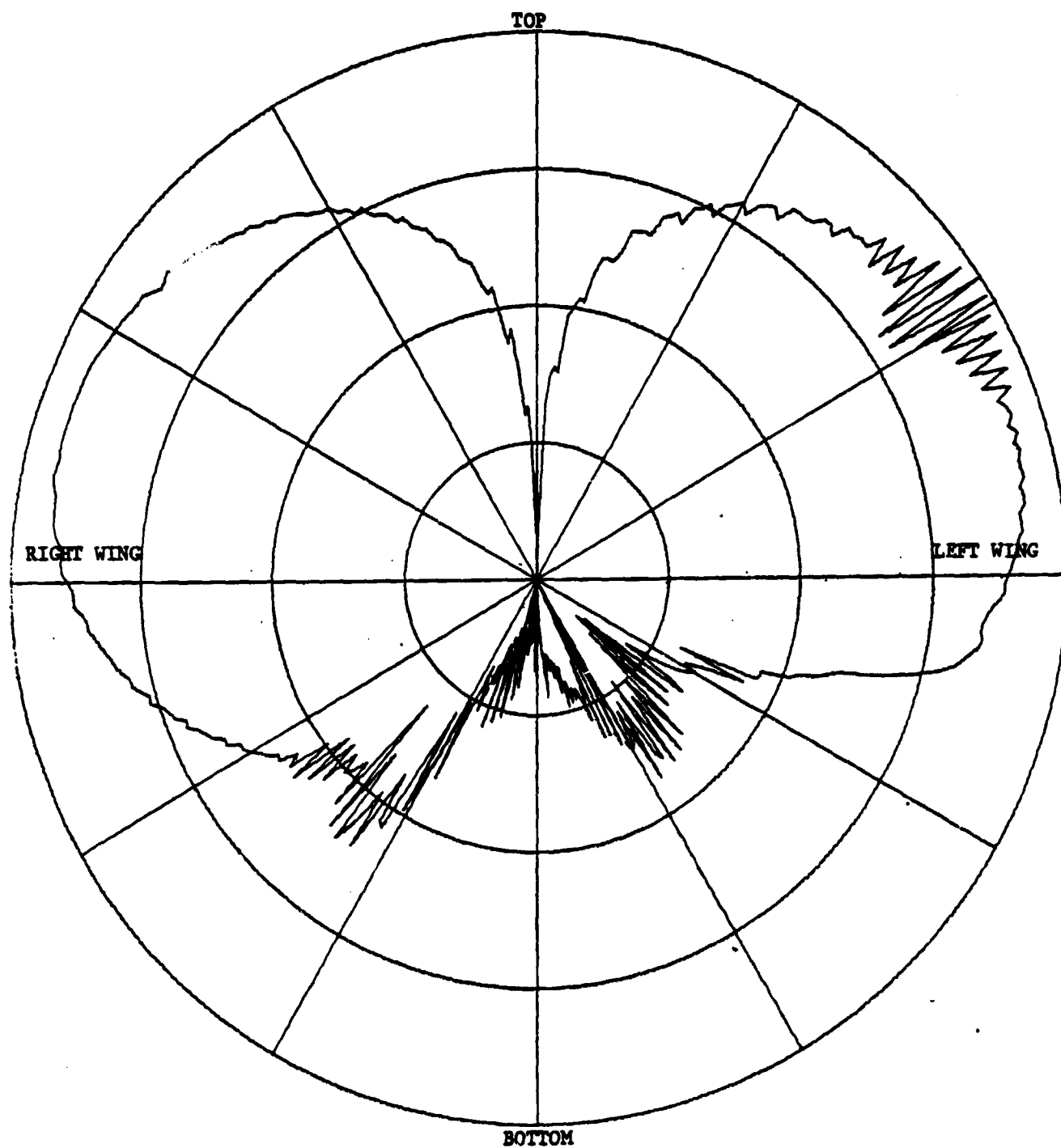


Figure II.57-2. Piper PA-31-350 Navajo Chieftain. Roll plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

PG  
20.0 28.64 30.558 28.645  
0. 0. 0.

PG  
4 T  
-21.248 20.0 -27.888  
-16.6 57.104 -8.632  
-16.6 57.104 75.032  
-21.248 20.0 82.336

PG  
6 F  
-16.6 57.104 -8.632  
-16.6 57.104 -63.08  
.664 55.112 -63.08  
.664 55.112 95.616  
-16.6 57.104 95.616  
-16.6 57.104 75.032

PG  
4 F  
.664 55.112 -63.08  
3.984 96.28 -63.08  
3.984 96.28 95.616  
.664 55.112 95.616

PG  
6 F  
-13.28 97.608 67.728  
-13.28 97.608 95.616  
3.984 96.28 95.616  
3.984 96.28 -63.08  
-13.28 97.608 -63.08  
-13.28 97.608 -5.976

PG  
4 F  
-13.28 97.608 -5.976  
-1.328 237.048 4.648  
-1.328 237.048 40.504  
-13.28 97.608 67.728

PG  
4 T  
-21.248 -20.0 82.336  
-16.6 -57.104 75.032  
-16.6 -57.104 -8.632  
-21.248 -20.0 -27.888

PG  
6 F  
-16.6 -57.104 75.032  
-16.6 -57.104 95.616  
.664 -55.112 95.616  
.664 -55.112 -63.08

-16.6 -57.104 -63.08  
-16.6 -57.104 -8.632

PG  
4 F  
.664 -55.112 95.616  
3.984 -96.28 95.616  
3.984 -96.28 -63.08  
.664 -55.112 -63.08

PG  
6 F  
-13.28 -97.608 -5.976  
-13.28 -97.608 -63.08  
3.984 -96.28 -63.08  
3.984 -96.28 95.616  
-13.28 -97.608 95.616  
-13.28 -97.608 67.728

PG  
4 F  
-13.28 -97.608 67.728  
-1.328 -237.048 40.504  
-1.328 -237.048 4.648  
-13.28 -97.608 -5.976

SG  
1  
0. -35.192  
0. 0. 0. .25 3  
1. 0.

PG  
0. 0. 90.  
0 360 1  
50000. 5.2

PP  
3.75 3

EX

Figure II.58-1. Piper PA-31-350 Navajo Chieftain. Data set for antenna location 2.

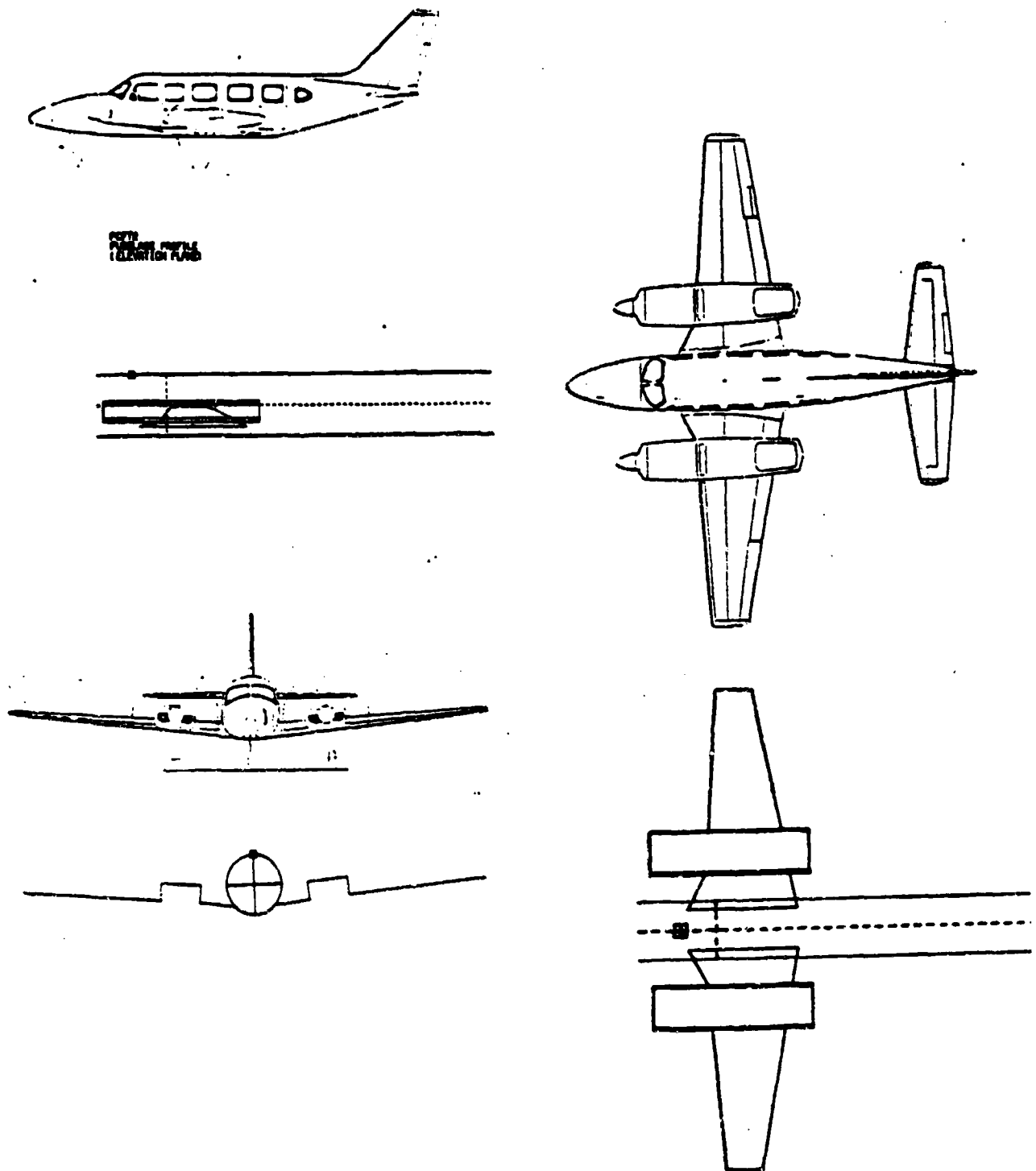


Figure II.58-2. Piper PA-31-350 Navajo Chieftain. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

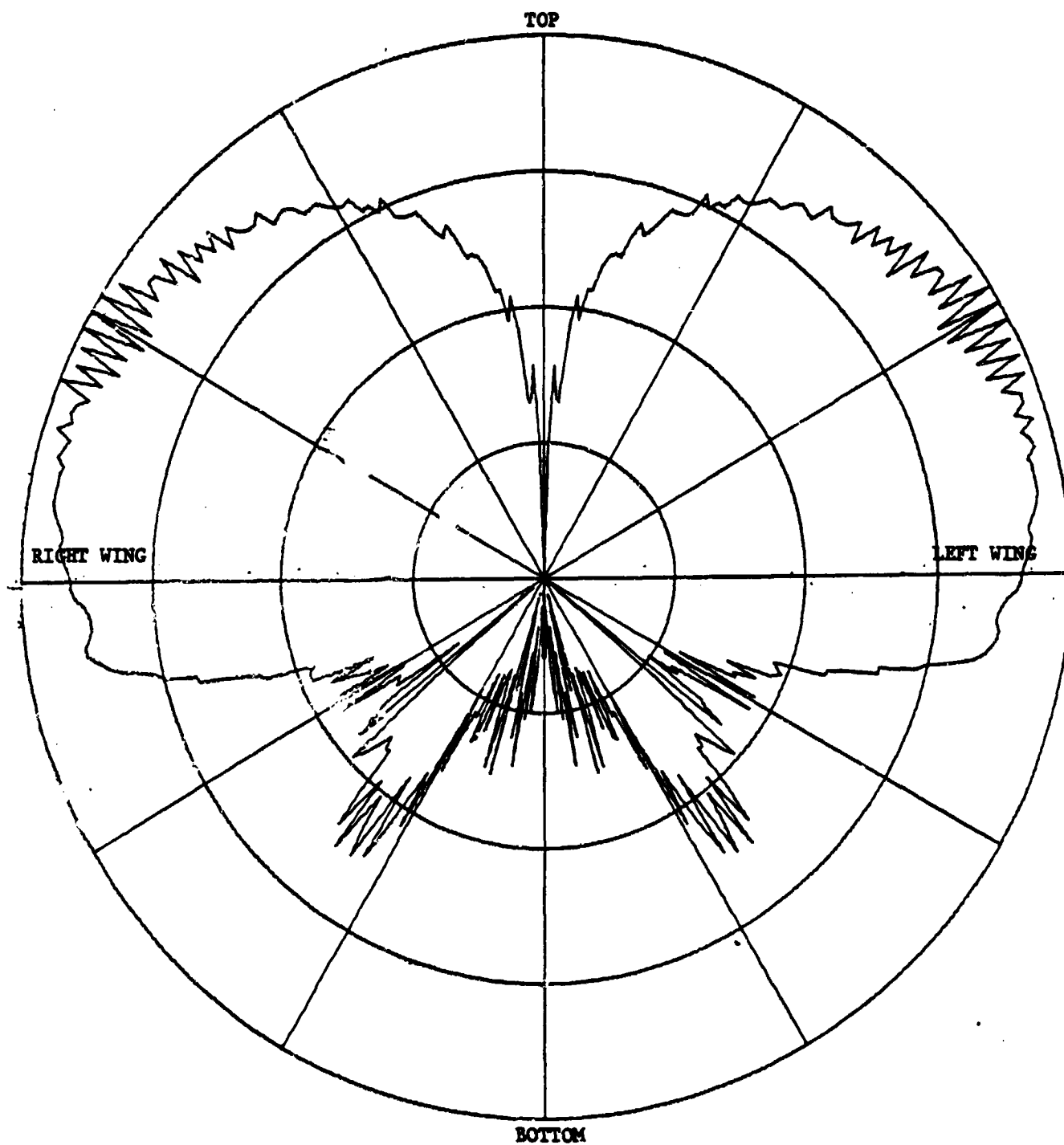


Figure II.58-3. Piper PA-31-350 Navajo Chieftain. Roll plane pattern for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

FC  
15. 19. 12. 18.  
0. 0. 0.  
FC  
1  
0.0 -41.168  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
FY

Figure II.59-1. Piper PA-31-350 Navajo Chieftain. Data set for  
antenna location 3.

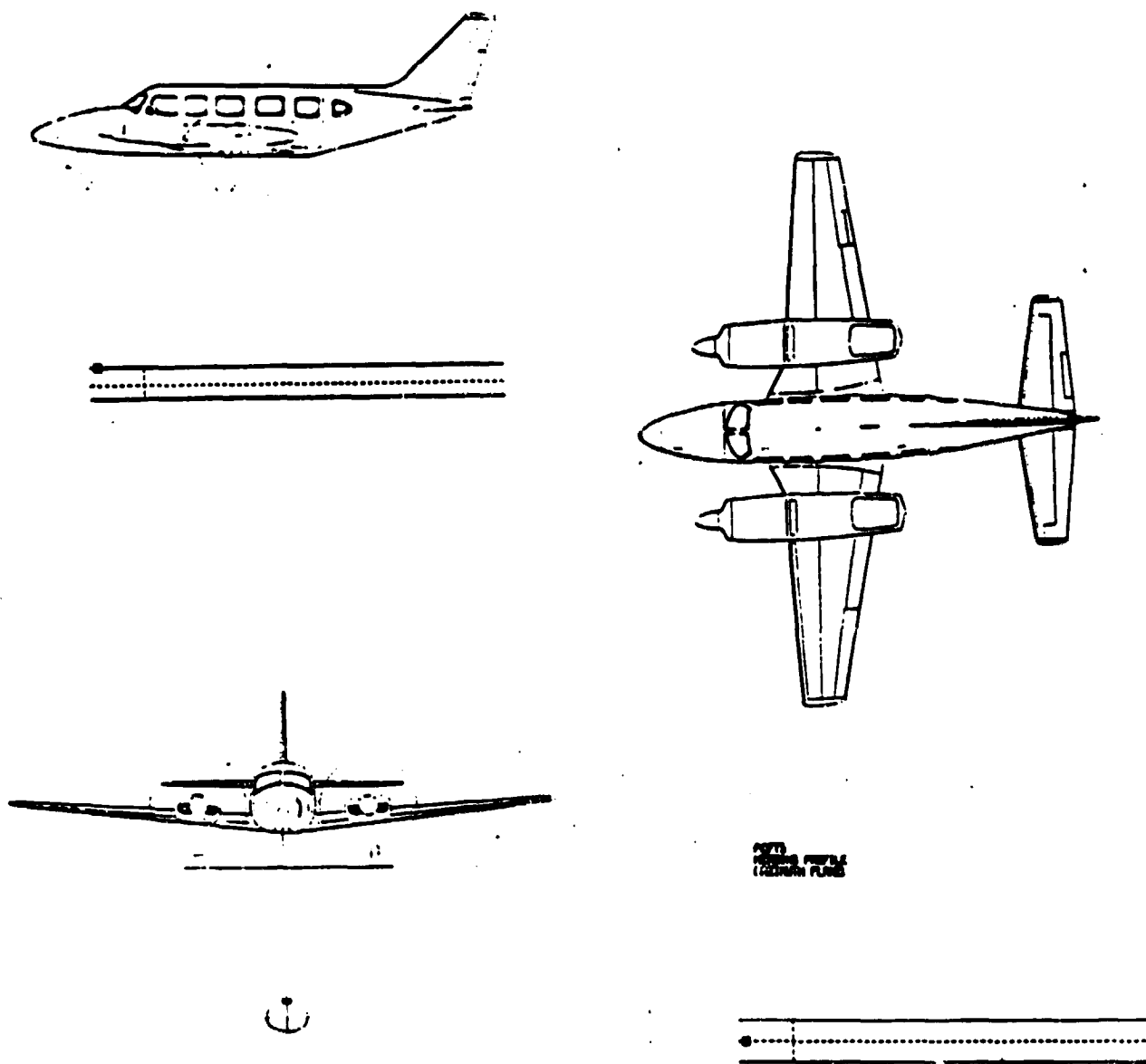


Figure II.59-2. Piper PA-31-350 Navajo Chieftain. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 3.

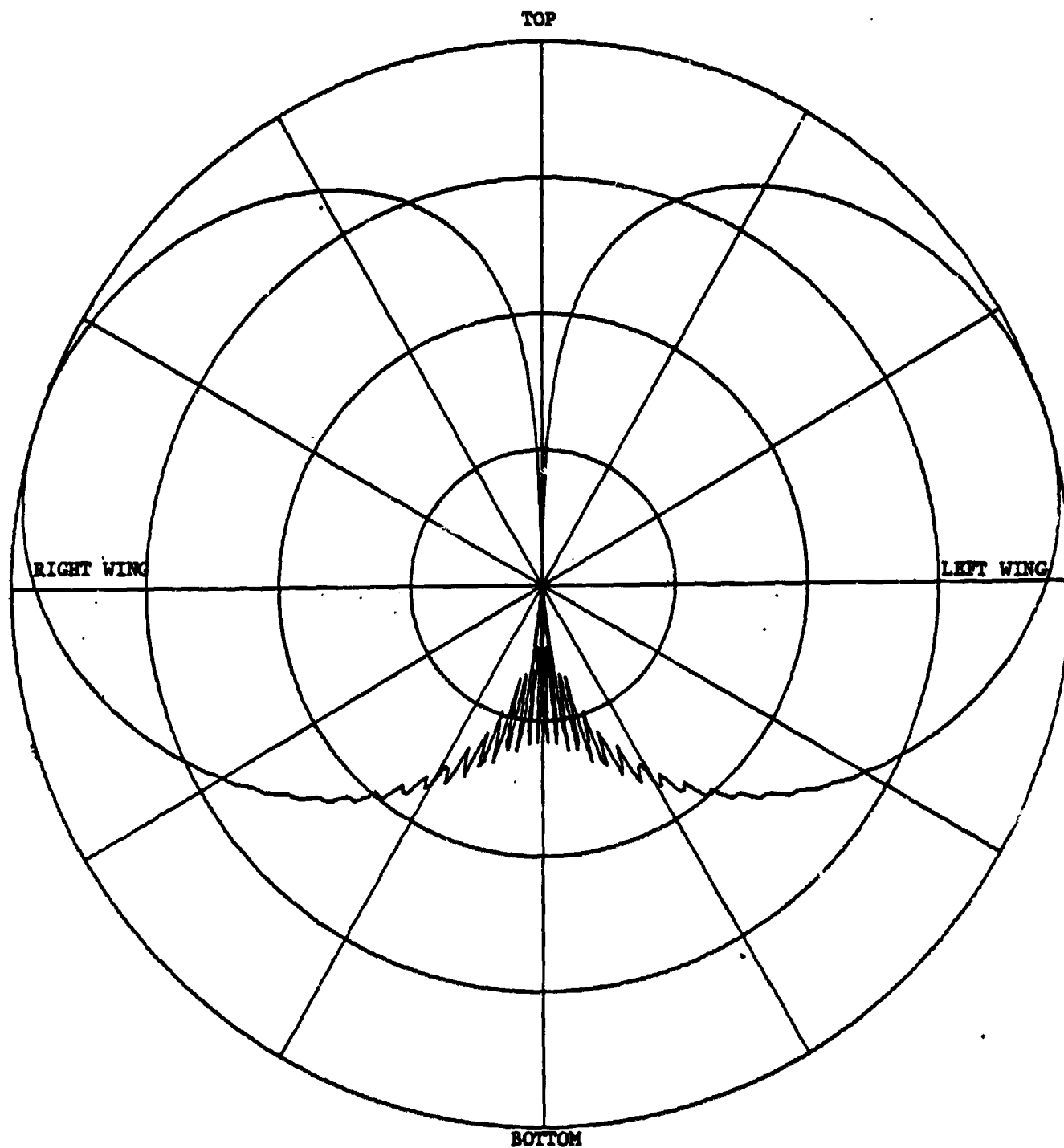


Figure II.59-3. Piper PA-31-350 Navajo Chieftain. Roll plane pattern for antenna location 3.



ORIGINAL PAGE IS  
OF POOR QUALITY

FG	23. 25. 29. 25.
	0. 0. 0.
PD	0. 0. 90.
	0 360 1
	50000. 5.2
PP	3.75 3
SC	1
	0. -28.552
	0. 0. 0. .25 3
	1. 0.
FX	

Figure II.60-1. Piper PA-31-350 Navajo Chieftain. Data set for antenna location 4.

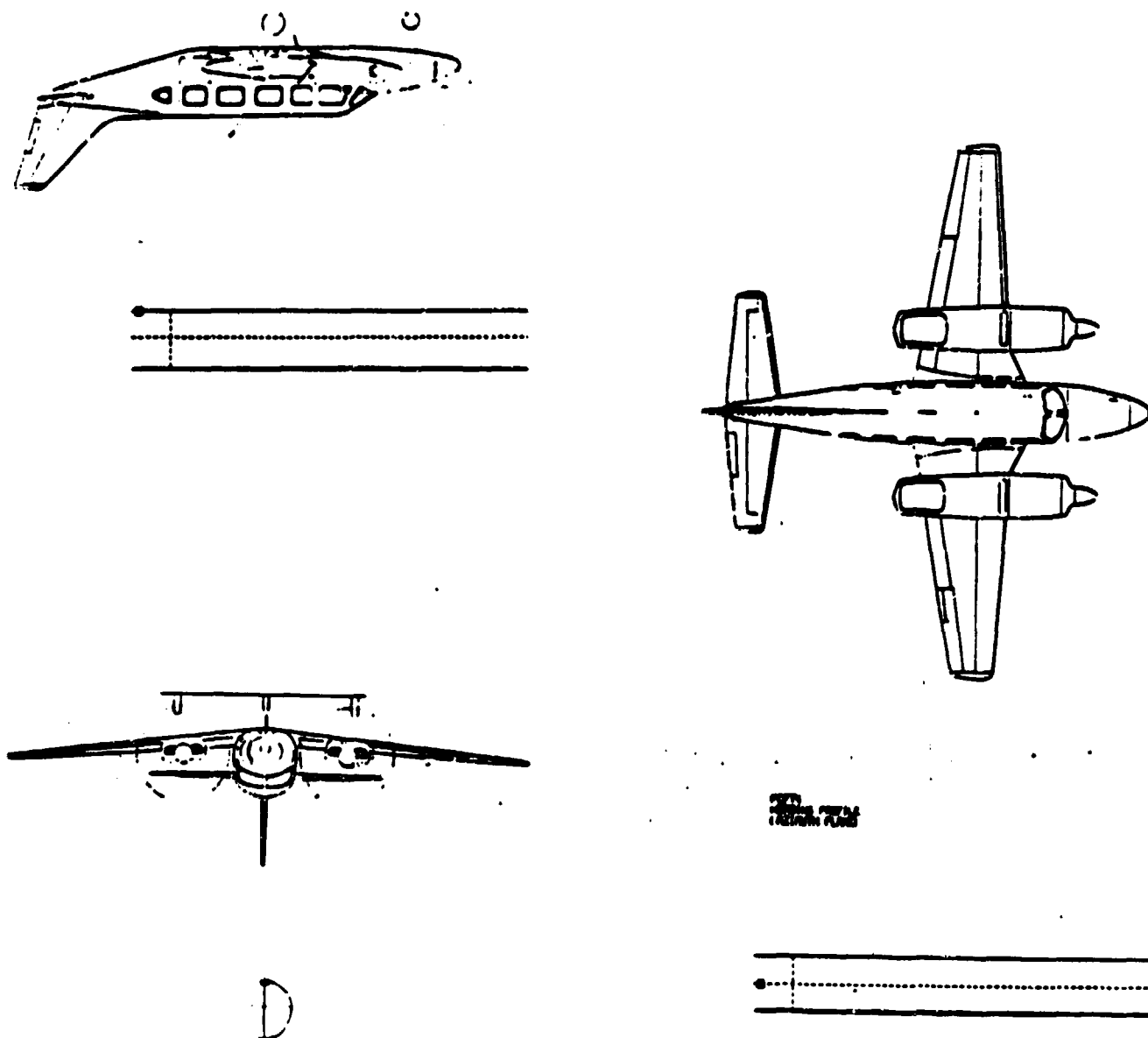


Figure II.60-2. Piper PA-31-350 Navajo Chieftain. Bottom rear 1/4 wavelength monopole antenna for antenna location 4.

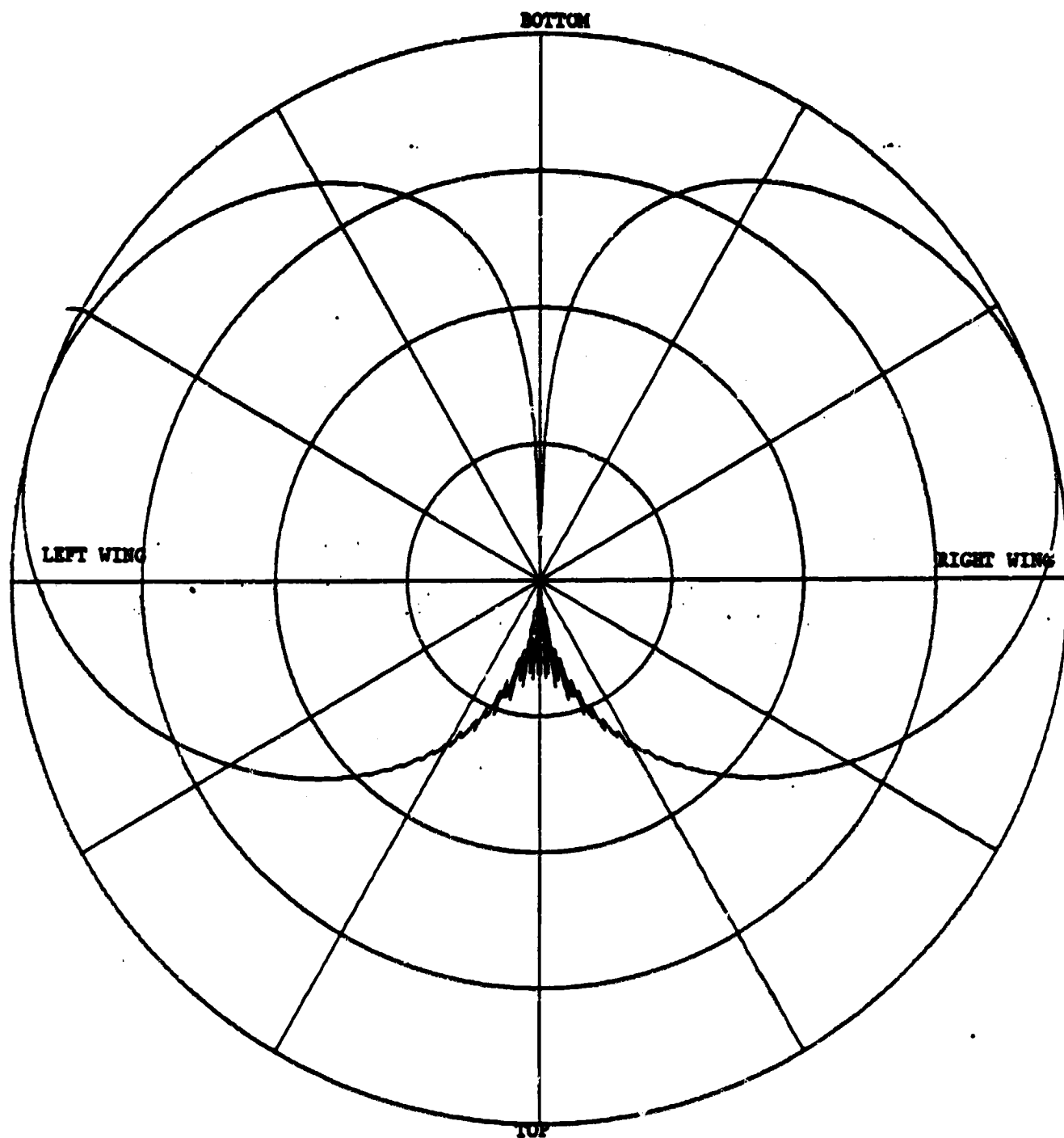


Figure II.60-3. Piper PA-31-350 Navajo Chieftain. Roll plane pattern for antenna location 4.

PG  
31.619 8.645 31.558 28.645  
0. 0. 0.  
PG  
4 T  
-21.248 20.0 -27.888  
-16.6 57.104 -8.632  
-16.6 57.104 75.032  
-21.248 20.0 82.336  
PG  
6 F  
-16.6 57.104 -8.632  
-16.6 57.104 -63.08  
.664 55.112 -63.08  
.664 55.112 95.616  
-16.6 57.104 95.616  
-16.6 57.104 75.032  
PG  
4 F  
.664 55.112 -63.08  
3.984 96.28 -63.08  
3.984 96.28 95.616  
.664 55.112 95.616  
PG  
6 F  
-13.28 97.608 67.728  
-13.28 97.608 95.616  
3.984 96.28 95.616  
3.984 96.28 -63.08  
-13.28 97.608 -63.08  
-13.28 97.608 -5.976  
PG  
4 F  
-13.28 97.608 -5.976  
-1.328 237.048 4.648  
-1.328 237.048 40.504  
-13.28 97.608 67.728  
PG  
4 T  
-21.248 -20.0 82.336  
-16.6 -57.104 75.032  
-16.6 -57.104 -8.632  
-21.248 -20.0 -27.888  
PG  
6 F  
-16.6 -57.104 75.032  
-16.6 -57.104 95.616  
.664 -55.112 95.616  
.664 -55.112 -63.08

-16.6 -57.104 -63.08  
-16.6 -57.104 -8.632  
PG  
4 F  
.664 -55.112 95.616  
3.984 -96.28 95.616  
3.984 -96.28 -63.08  
.664 -55.112 -63.08  
PG  
6 F  
-13.28 -97.608 -5.976  
-13.28 -97.608 -63.08  
3.984 -96.28 -63.08  
3.984 -96.28 95.616  
-13.28 -97.608 95.616  
-13.28 -97.608 67.728  
PG  
4 F  
-13.28 -97.608 67.728  
-1.328 -237.048 40.504  
-1.328 -237.048 4.648  
-13.28 -97.608 -5.976  
SG  
1  
0.0 -24.568  
0. 0. 0. .25 3  
1. 0.  
PN  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.61-1. Piper PA-31-350 Navajo Chieftain. Data set  
for antenna location 5.

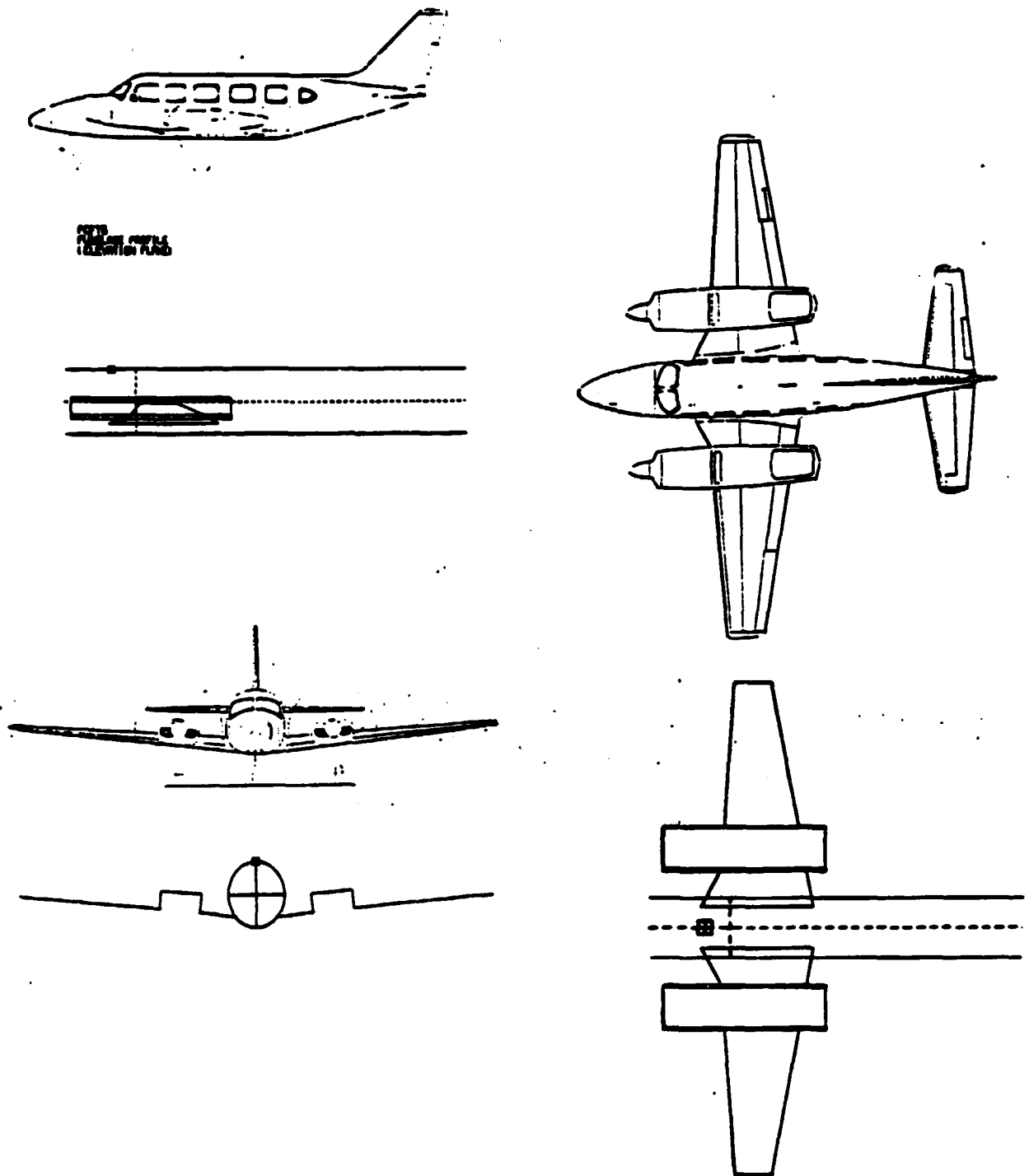


Figure II.61-2. Piper PA-31-350 Navajo Chieftain. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 5.

E-PHI  
DB PLOT

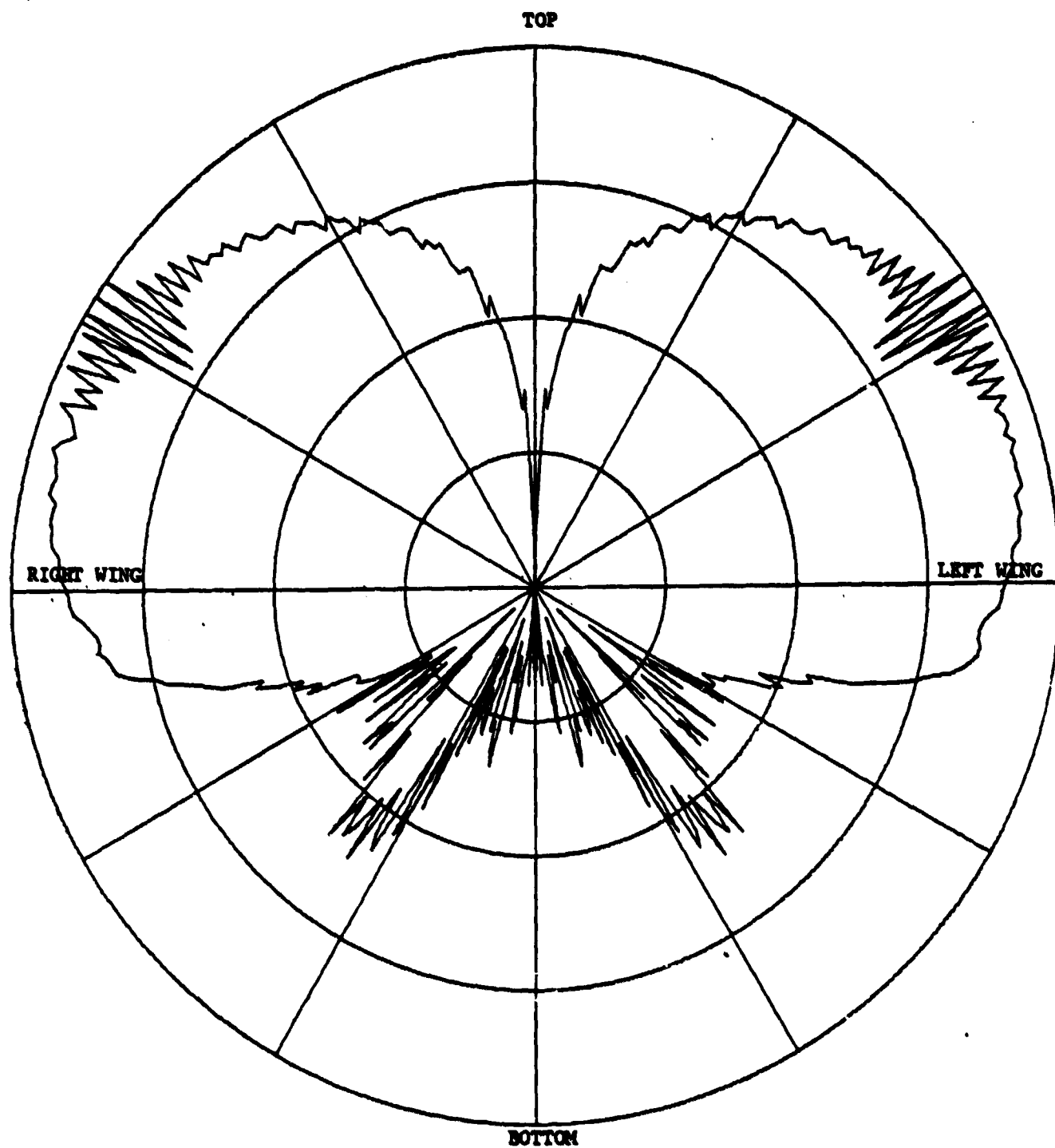


Figure II.61-3. Piper PA-31-350 Navajo Chieftain. Roll plane pattern for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

PG
17. 20. 14. 20.
0. 0. 0.
PG
4 F
-3.32 69.056 -6.64
13.28 69.056 -6.64
13.28 69.056 159.36
-3.32 69.056 159.36
PG
4 F
13.28 69.056 -6.64
12.614 85.656 -6.64
12.615 85.656 159.36
13.28 69.056 159.36
PG
4 F
-3.32 85.656 159.36
12.614 85.656 159.36
12.615 85.656 -6.64
-3.32 85.656 -6.64
PG
4 F
-3.32 69.056 -6.64
-3.32 69.056 159.36
-3.32 85.656 159.36
-3.32 85.656 -6.64
PG
3 F
13.28 69.056 -6.64
5.312 76.36 -29.216
12.615 85.656 -6.64
PG
3 F
13.28 69.056 -6.64
-3.32 69.056 -6.64
5.312 76.36 -29.216
PG
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3
SG
1
0. -29.552
0. 0. 0. .25 3
1. 0.
FX

```

Figure II.62-1. Piper PA-31-350 Navajo Chieftain. Data set for antenna location 6.

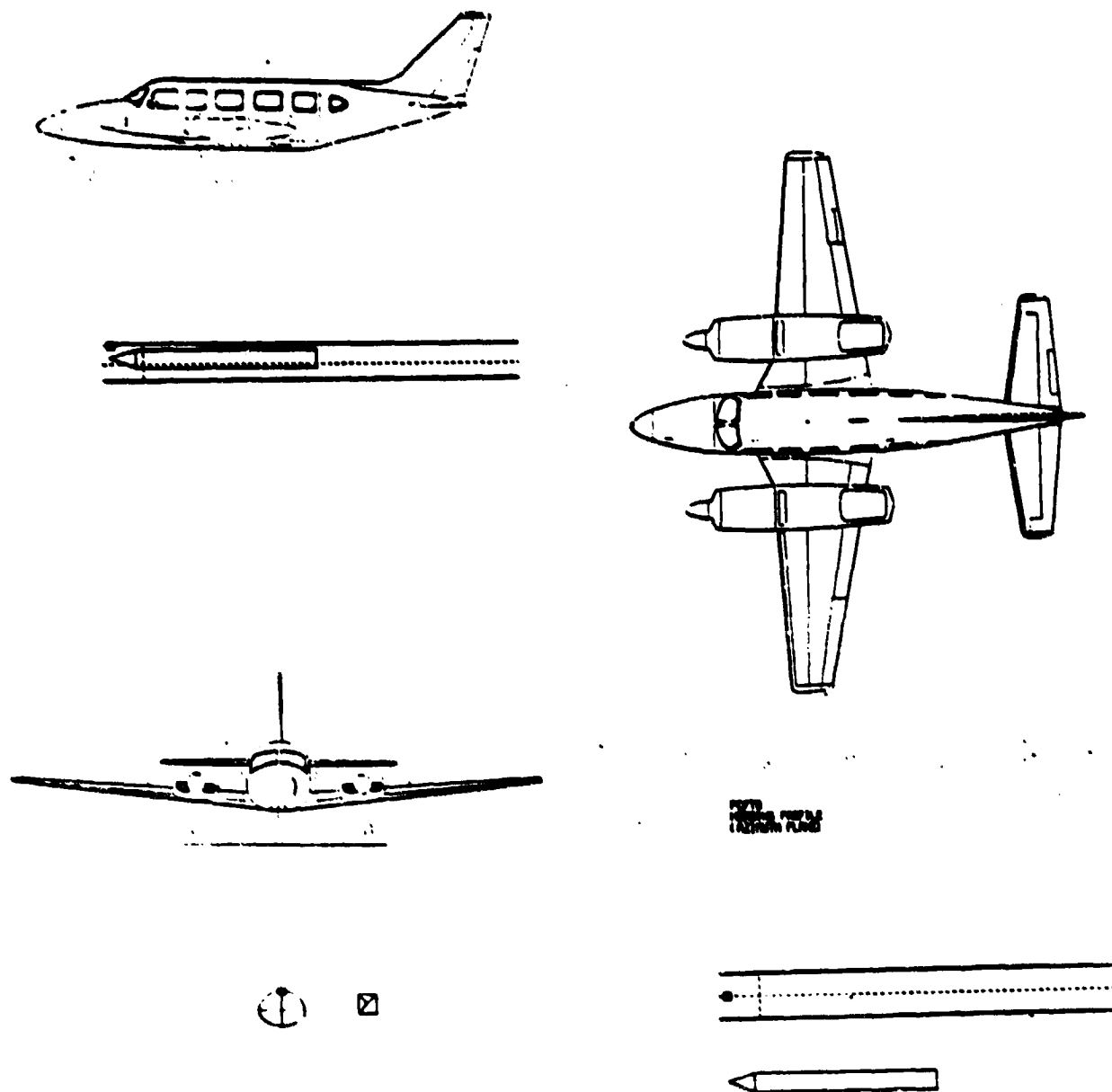


Figure II.62-2. Piper PA-31-350 Navajo Chieftain. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 6.



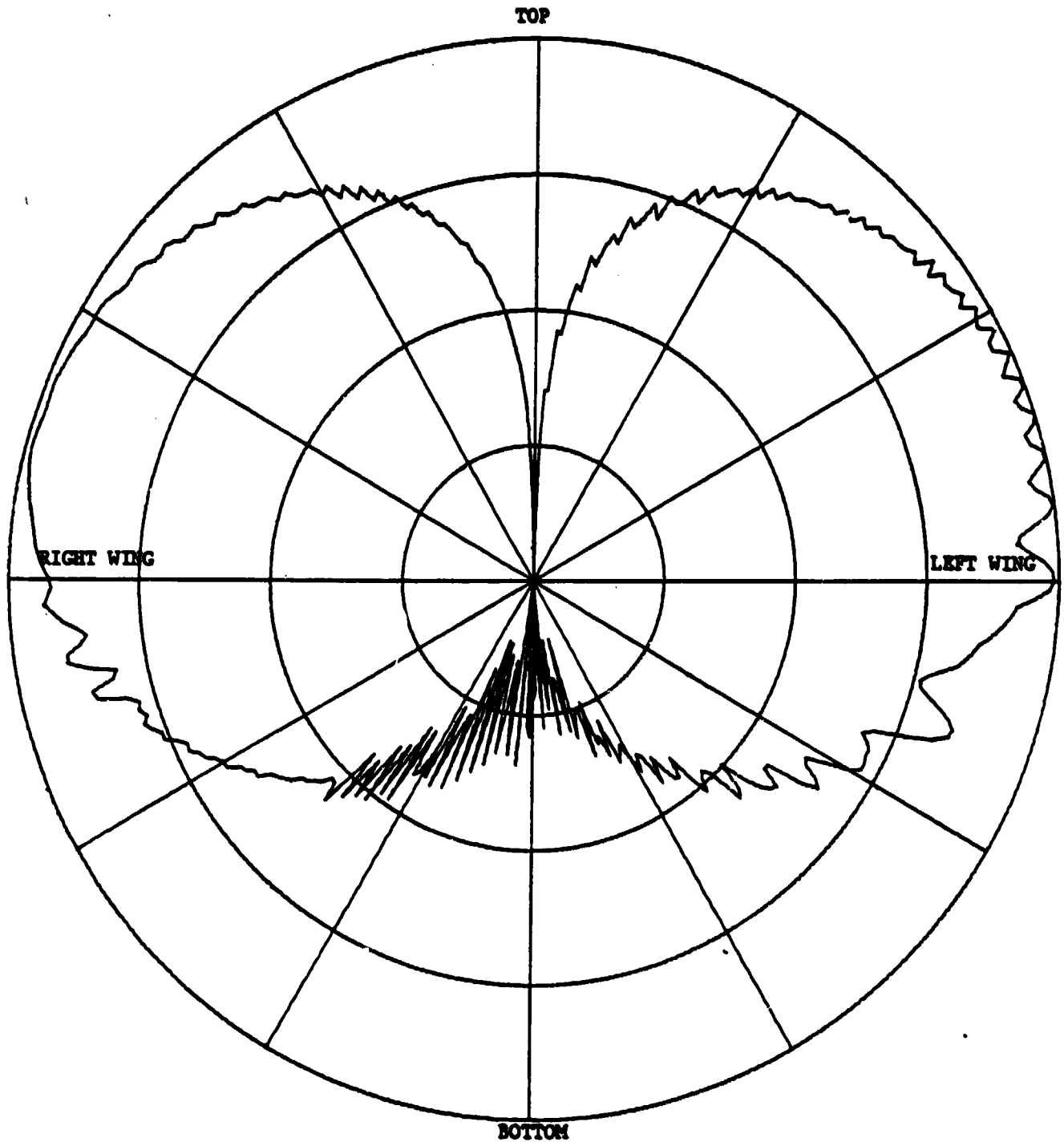


Figure II.62-3. Piper PA-31-350 Navajo Chieftain. Roll plane pattern for antenna location 6.

ORIGINAL PAGE IS  
OF POOR QUALITY

EG  
17. 20. 14. 20.  
0. 1. 0.  
DG  
3 F  
13.28 69.056 -6.64  
5.312 76.36 -29.216  
12.616 85.656 -6.64  
DG  
3 F  
13.28 69.056 -6.64  
-3.32 69.056 -6.64  
5.312 76.36 -29.216  
DG  
0. 0. 90.  
0 360 1  
50000. 5.2  
PR  
3.75 3  
CG  
1  
0. -28.552  
0. 0. 0. .25 3  
1. 0.  
EX

Figure II.63-1. Piper PA-31-350 Navajo Chieftain. Data set modeled without engine for antenna location 6.

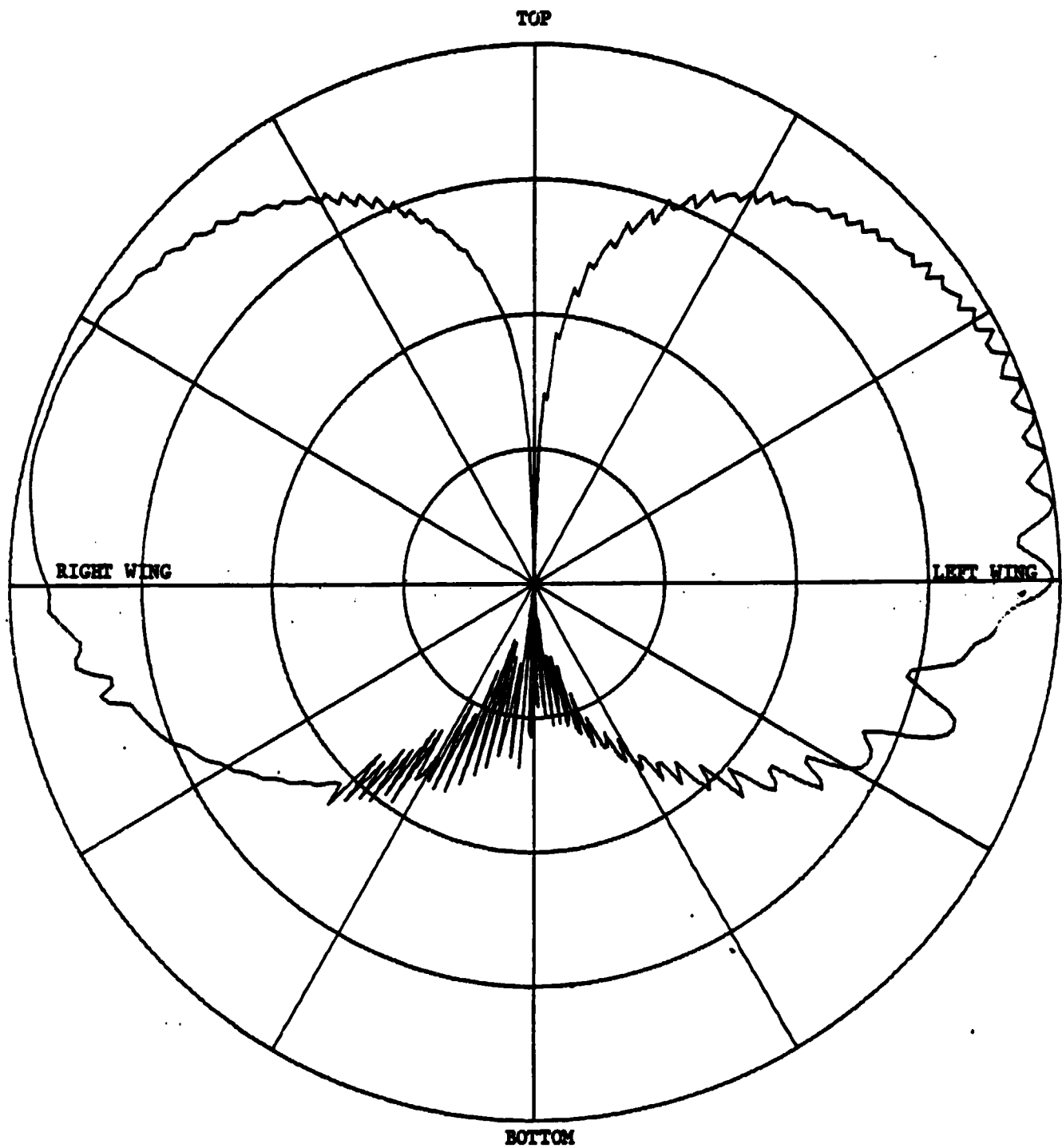
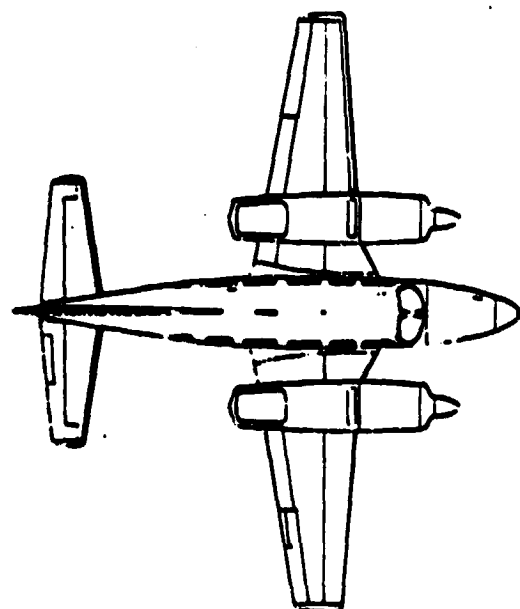
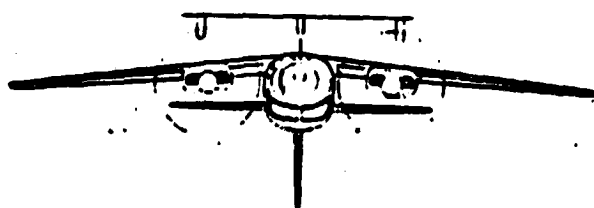
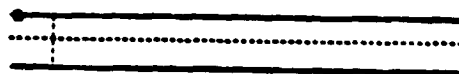
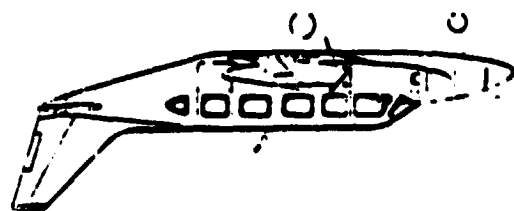


Figure II.63-2. Piper PA-31-350 Navajo Chieftain. Roll plane pattern for antenna location 6.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
14. 20. 24. 20.  
0. 0. 0.  
UN  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
SG  
1  
0. -29.552  
0. 0. 0. .25 3  
1. 0.  
FX

Figure II.64-1. Piper PA-31-350 Navajo Chieftain. Data set  
for antenna location 7.



SEE  
FIGURE 7008

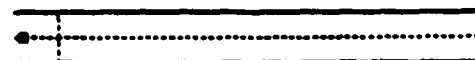


Figure II.64-2. Piper PA-31-350 Navajo Chieftain. Bottom rear 1/4 wavelength monopole antenna for antenna location 7.

E-PHI  
DB PLOT

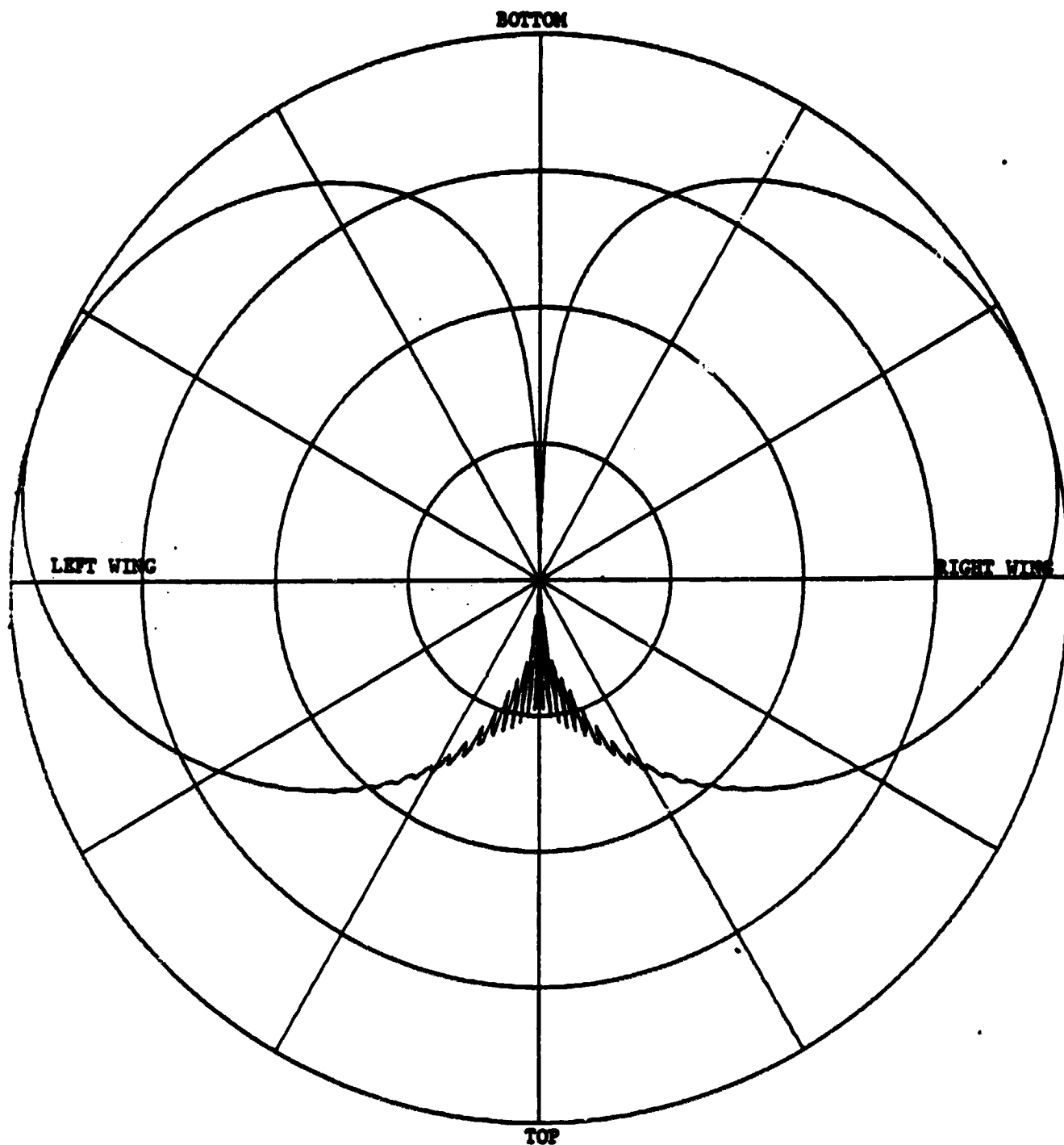


Figure II.64-3. Piper PA-31-350 Navajo Chieftain. Roll plane pattern for antenna location 7.

### **II.7. Beechcraft Duke B60**

**Roll plane patterns are calculated for seven particular antenna locations of this aircraft.**

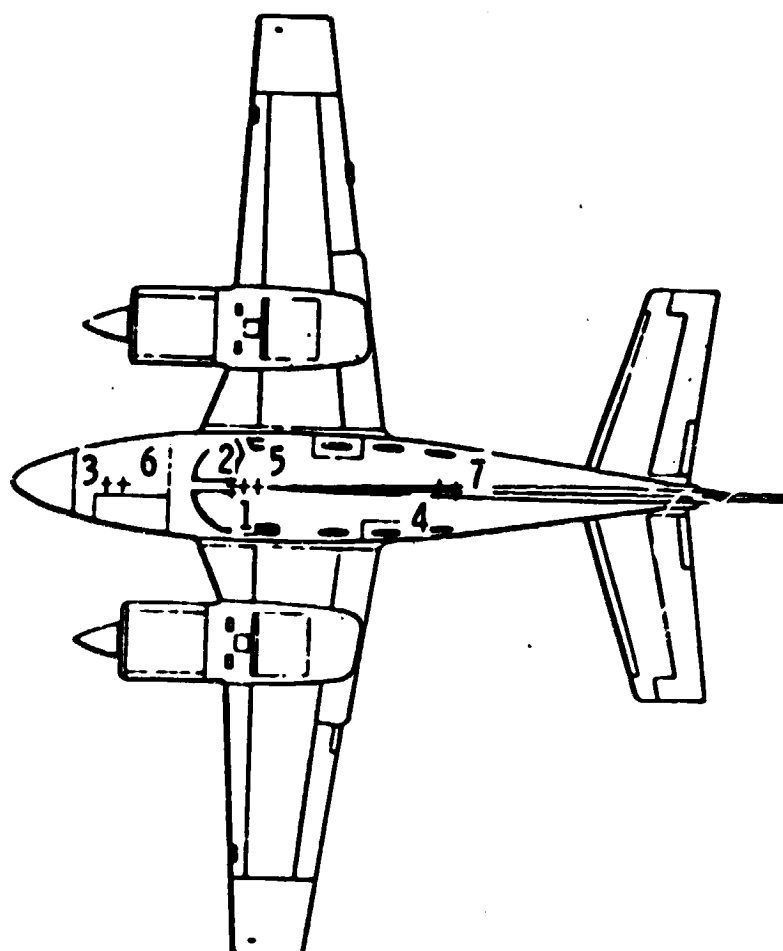
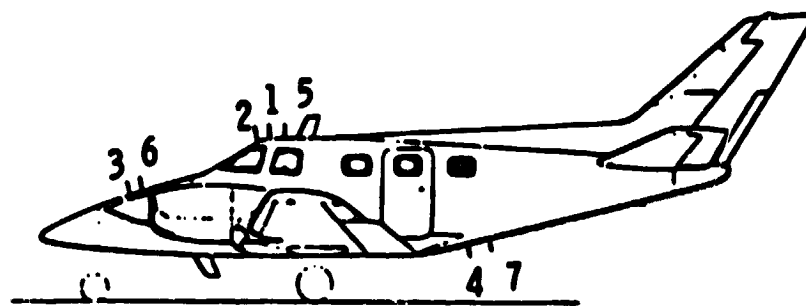


Figure II.65. Beechcraft Duke B60. Antenna locations.



ORIGINAL PAGE IS  
OF POOR QUALITY

PG  
24.87 29.26 34.60 29.26  
0. 0. 0.

PG  
4 T  
-21.054 17.864 12.122  
-16.588 58.058 29.986  
-16.588 58.058 105.27  
-21.054 17.864 111.012

PG  
5 F  
-16.588 58.058 29.986  
-16.588 58.058 -22.33  
-.638 58.058 -22.33  
-.638 58.058 105.27  
-16.588 58.058 105.27

PG  
4 F  
-.638 58.058 -22.33  
3.828 98.89 -22.33  
3.828 98.89 99.528  
-.638 58.058 105.27

PG  
5 F  
-13.398 98.89 99.528  
3.828 98.89 99.528  
3.828 98.89 -22.33  
-13.398 98.89 -22.33  
-13.398 98.89 32.538

PG  
4 F  
-13.398 98.89 32.538  
.638 233.508 41.47  
.638 233.508 76.56  
-13.398 98.89 99.528

PG  
4 T  
-21.054 -17.864 111.012  
-16.588 -58.058 105.27  
-16.588 -58.058 29.986  
-21.054 -17.864 12.122

PG  
5 F  
-16.588 -58.058 105.27  
-.638 -58.058 105.27  
-.638 -58.058 -22.33  
-16.588 -58.058 -22.33  
-16.588 -58.058 29.986

PG

4 F  
-.638 -58.058 105.27  
3.828 -98.89 99.528  
3.828 -98.89 -22.33  
-.638 -58.058 -22.33

PG  
5 F  
-13.398 -98.89 32.538  
-13.398 -98.89 -22.33  
3.828 -98.89 -22.33  
3.828 -98.89 99.528  
-13.398 -98.89 99.528

PG  
4 F  
-13.398 -98.89 99.528  
.638 -233.508 76.56  
.638 -233.508 41.47  
-13.398 -98.89 32.538

SG  
J  
0. 39.556  
0. 0. 0. .25 3  
1. 0.

PN  
0. 0. 90.  
0 360 1  
50000. 5.2

PP  
3.75 3  
EX

Figure II.66-1. Beechcraft Duke B60. Data set for antenna location 1.

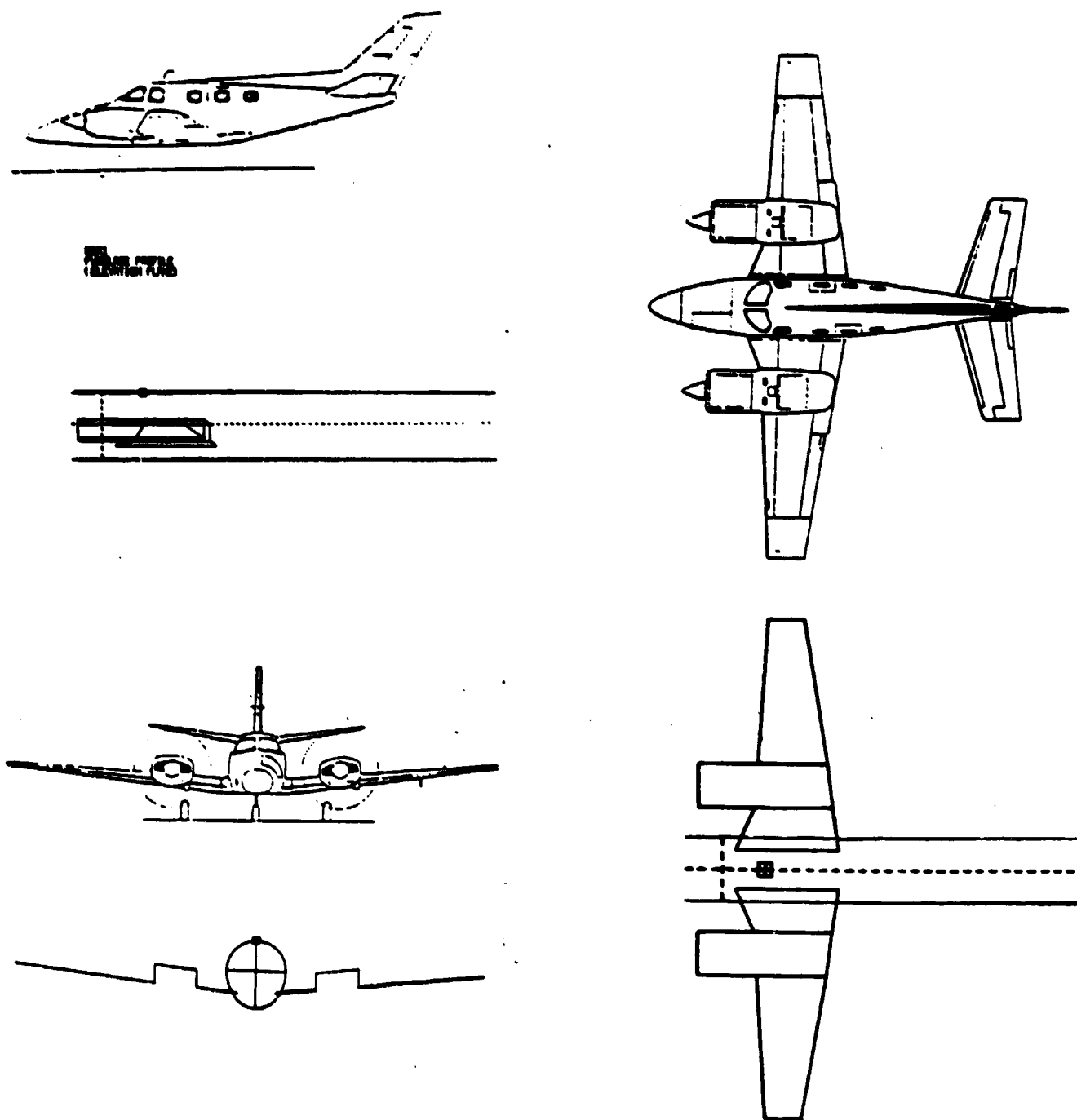


Figure II.66-2. Beechcraft Duke B60. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 1.

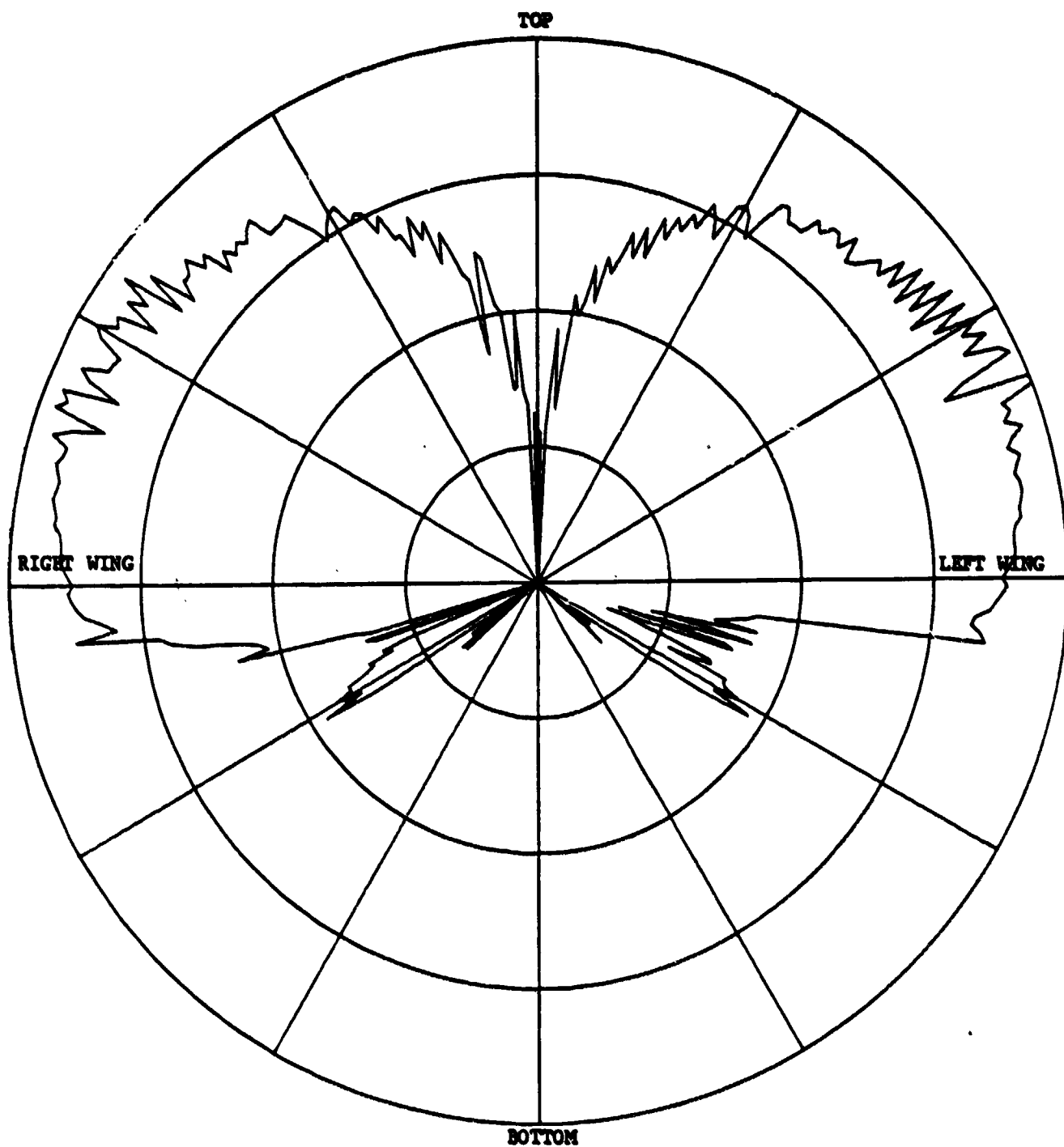


Figure II.66-3. Beechcraft Duke B60. Roll plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
28.47 29.26 34.60 29.26  
0. 0. 0.

PG  
4 T  
-21.054 17.864 12.122  
-16.588 58.058 29.986  
-16.588 58.058 105.27  
-21.054 17.864 111.012

PG  
5 F  
-16.588 58.058 29.986  
-16.588 58.058 -22.33  
-.638 58.058 -22.33  
-.638 58.058 105.27  
-16.588 58.058 105.27

PG  
4 F  
-.638 58.058 -22.33  
3.828 98.89 -22.33  
3.828 98.89 99.528  
-.638 58.058 105.27

PG  
5 F  
-13.398 98.89 99.528  
3.828 98.89 99.528  
3.828 98.89 -22.33  
-13.398 98.89 -22.33  
-13.398 98.89 32.538

PG  
4 F  
-13.398 98.89 32.538  
.638 233.508 41.47  
.638 233.508 76.56  
-13.398 98.89 99.528

PG  
4 T  
-21.054 -17.864 111.012  
-16.588 -58.058 105.27  
-16.588 -58.058 29.986  
-21.054 -17.864 12.122

PG  
5 F  
-16.588 -58.058 105.27  
-.638 -58.058 105.27  
-.638 -58.058 -22.33  
-16.588 -58.058 -22.33  
-16.588 -58.058 29.986  
PG

4 F  
-.638 -58.058 105.27  
3.828 -98.89 99.528  
3.828 -98.89 -22.33  
-.638 -58.058 -22.33

PG  
5 F  
-13.398 -98.89 32.538  
-13.398 -98.89 -22.33  
3.828 -98.89 -22.33  
3.828 -98.89 99.528  
-13.398 -98.89 99.528

PG  
4 F  
-13.398 -98.89 99.528  
.638 -233.508 76.56  
.638 -233.508 41.47  
-13.398 -98.89 32.538

SG  
1  
0. 35.728  
0. 0. 0. .25 3  
1. 0.

PD  
0. 0. 90.  
0 360 1  
50000. 5.2

PP  
3.75 3  
EX

Figure II.67-1. Beechcraft Duke B60. Data set for antenna location 2.

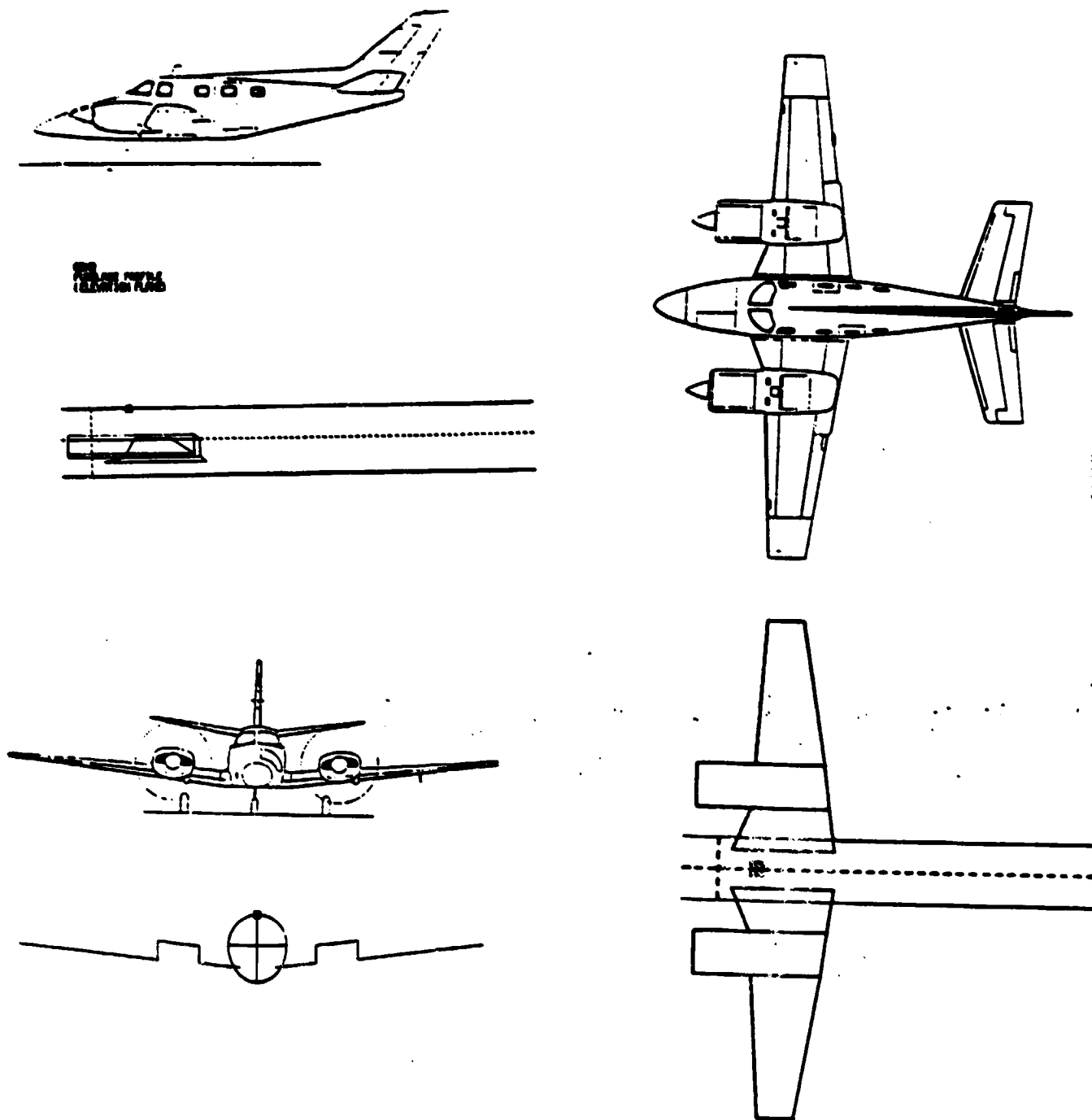


Figure II.67-2. Beechcraft Duke B60. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

E-PHI  
DB PLOT

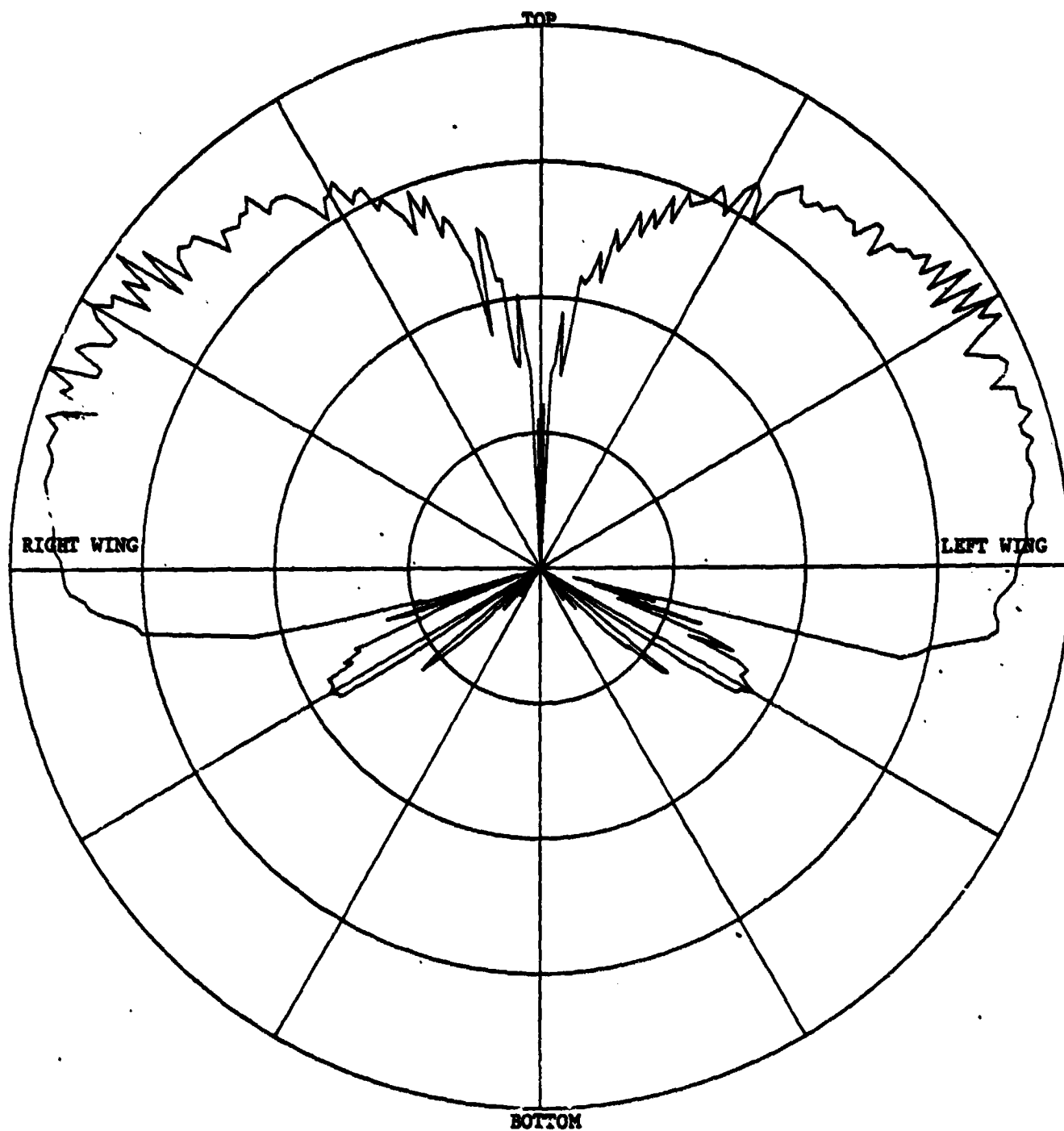


Figure II.67-3. Beechcraft Duke B60. Roll plane pattern for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

PG  
10. 19. 11. 19.  
0. 0. 0.  
PG  
4 F  
0. 58.058 -21.692  
16.588 58.058 -21.692  
16.588 58.058 105.27  
0. 58.058 105.27  
PG  
4 F  
19.16 85.492 -21.692  
20.416 98.89 -21.692  
20.416 98.89 98.89  
16.588 58.058 105.27  
16.588 58.058 -21.692  
17.764 70.818 -21.692  
PG  
4 F  
20.416 98.89 98.89  
20.416 98.89 -21.692  
3.828 98.89 -21.692  
3.828 98.89 98.89  
PG  
4 F  
16.588 58.058 -21.692  
0. 58.058 -21.692  
3.828 98.89 -21.692  
20.416 98.89 -21.692  
PG  
3 F  
17.784 70.818 -21.692  
17.208 78.474 -47.85  
19.16 85.492 -21.692  
PG  
3 F  
2.552 72.694 -20.416  
10.208 78.474 -47.85  
17.764 70.818 -21.692

SG  
1  
0. -34.452  
0. 0. 0. .25 1  
1. 0.  
PD  
0. 0. 31.  
0 360 1  
50000. 5.2  
PP  
7.75 3  
LY

Figure II.68-1. Beechcraft Duke B60. Data set for antenna location 3.

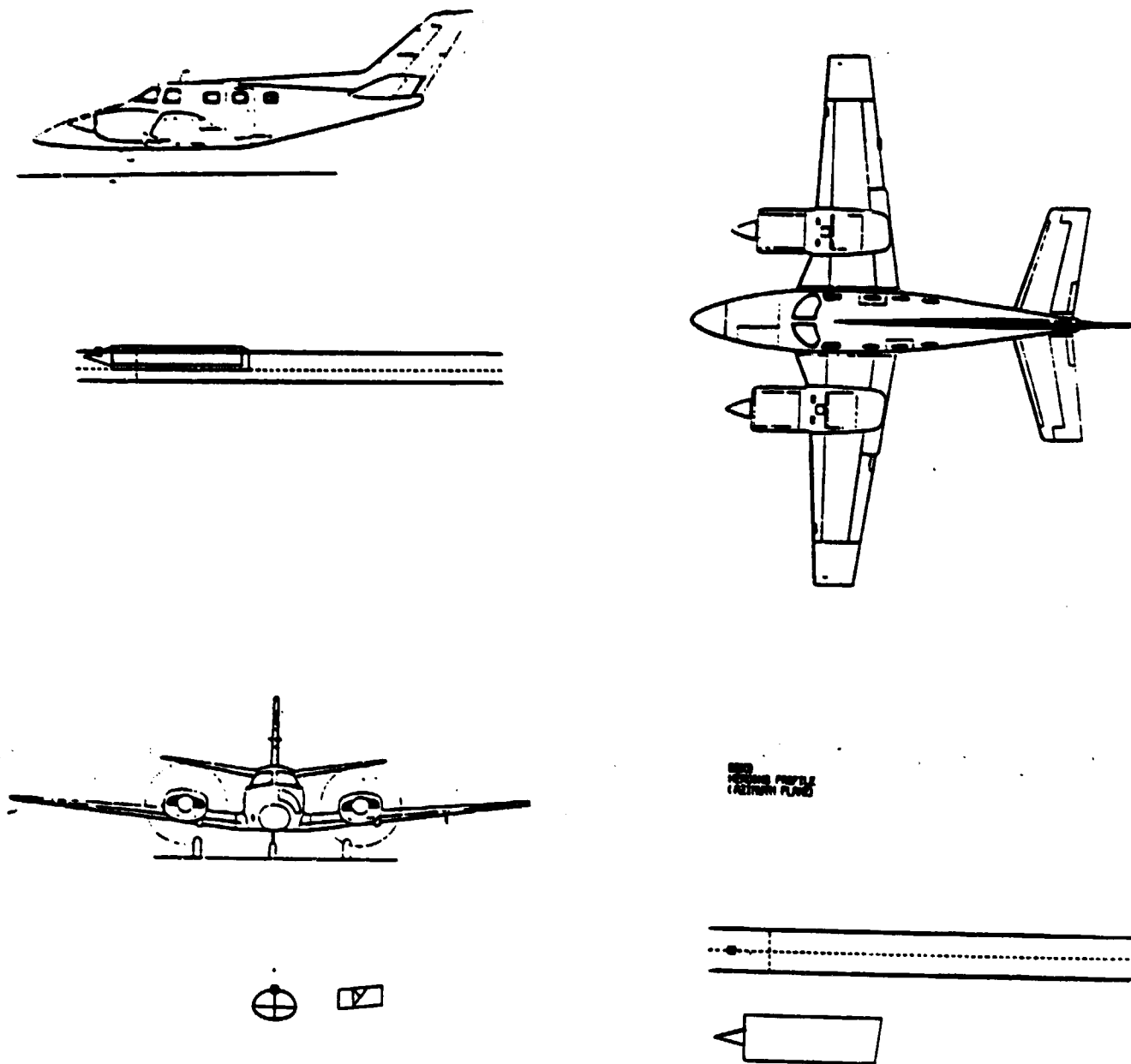


Figure II.68-2. Beechcraft Duke B60. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 3.



E-PHI  
DB PLOT

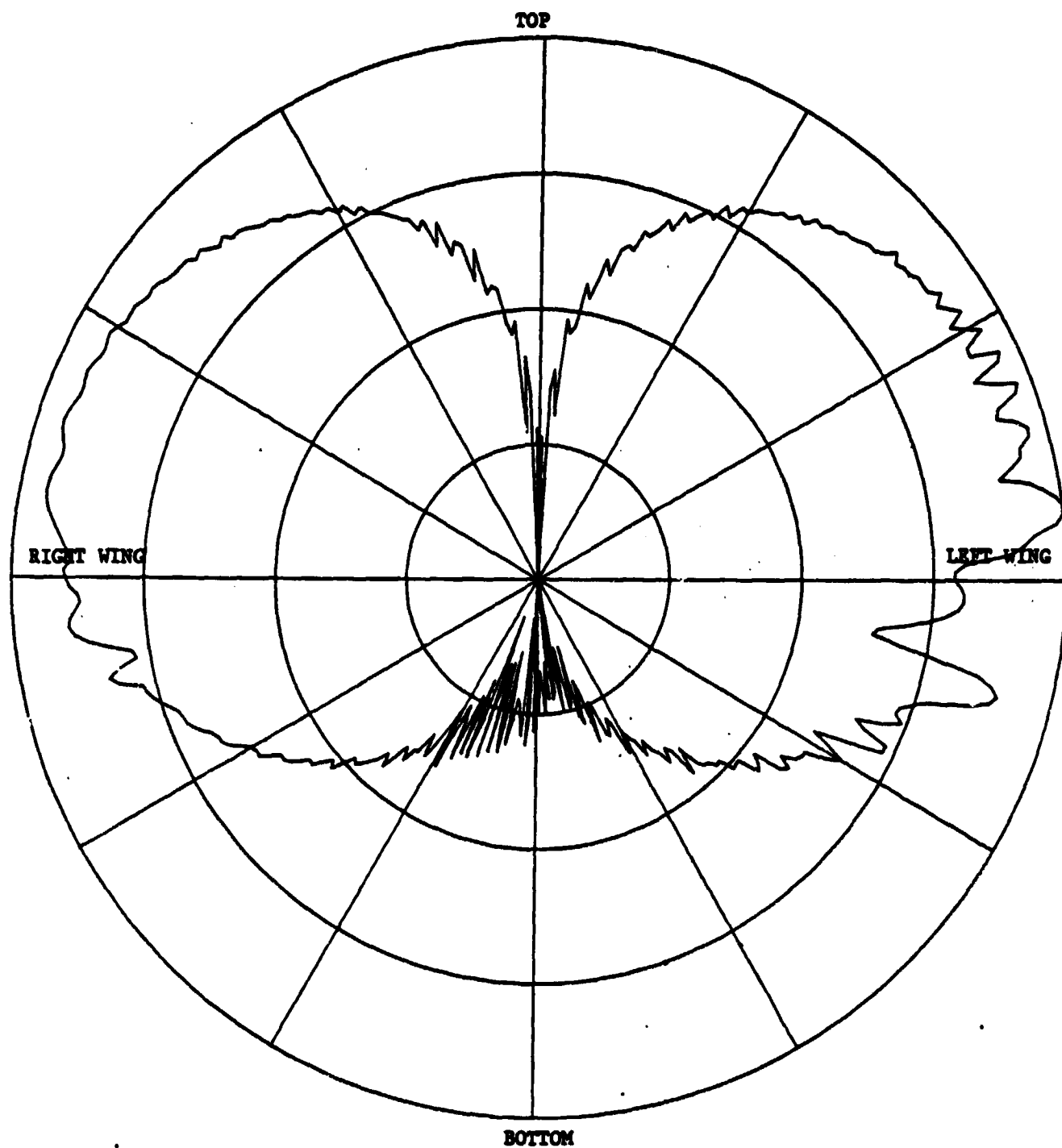


Figure II.68-3. Beechcraft Duke B60. Roll plane pattern for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
22. 24. 26. 24.
0. 0. 0.
SC
1
0. -34.452
0. 0. 0. 25.3
1. 0.
PD
0. 0. 90.
0 360 1
±0000. 5.2
PP
3.75 3
EX

```

Figure II.69-1. Beechcraft Duke B60. Data set for antenna location 4.

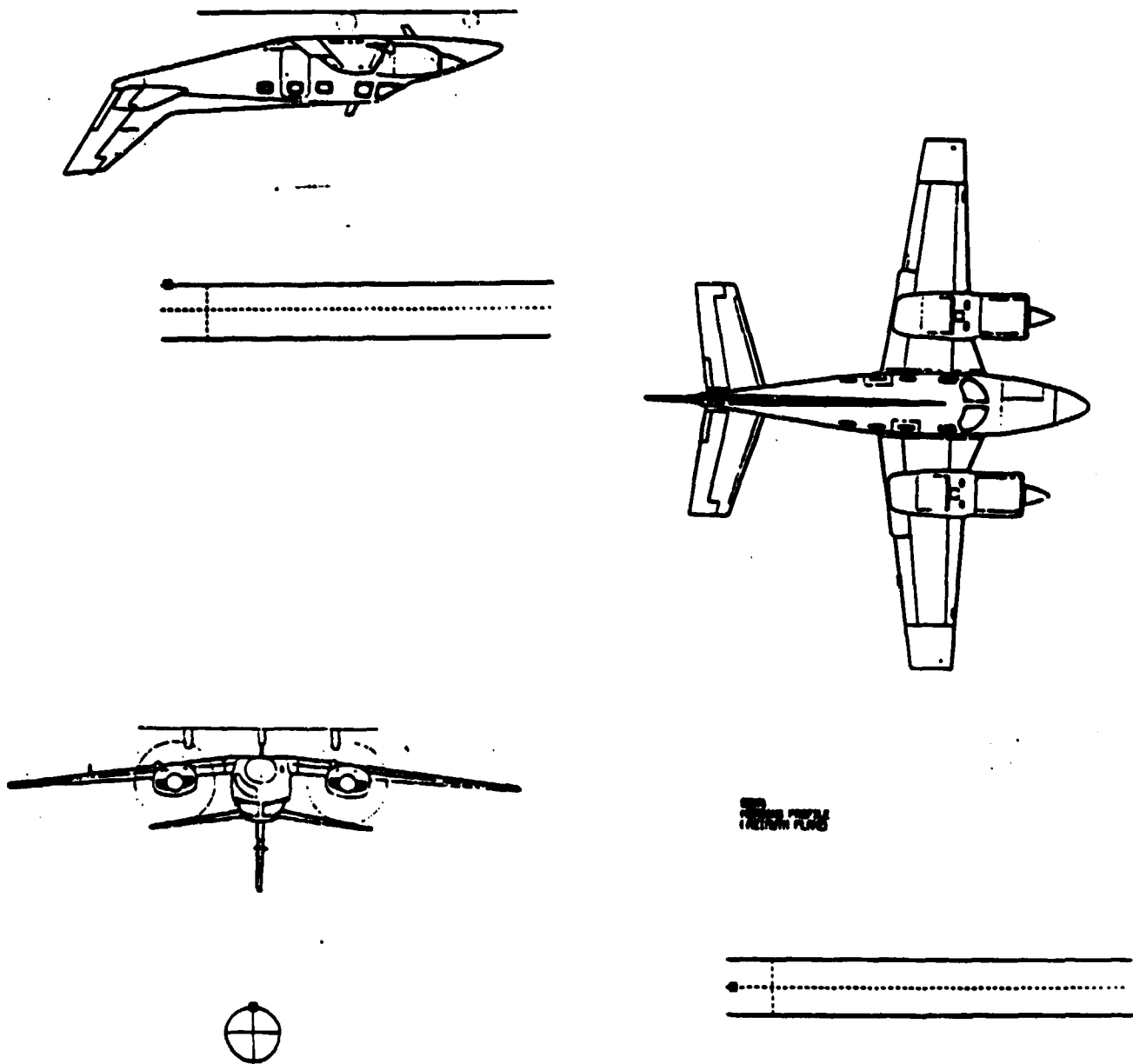


Figure II.69-2. Beechcraft Duke B60. Bottom rear 1/4 wavelength monopole antenna for antenna location 4.

E-PHI  
DB PLOT

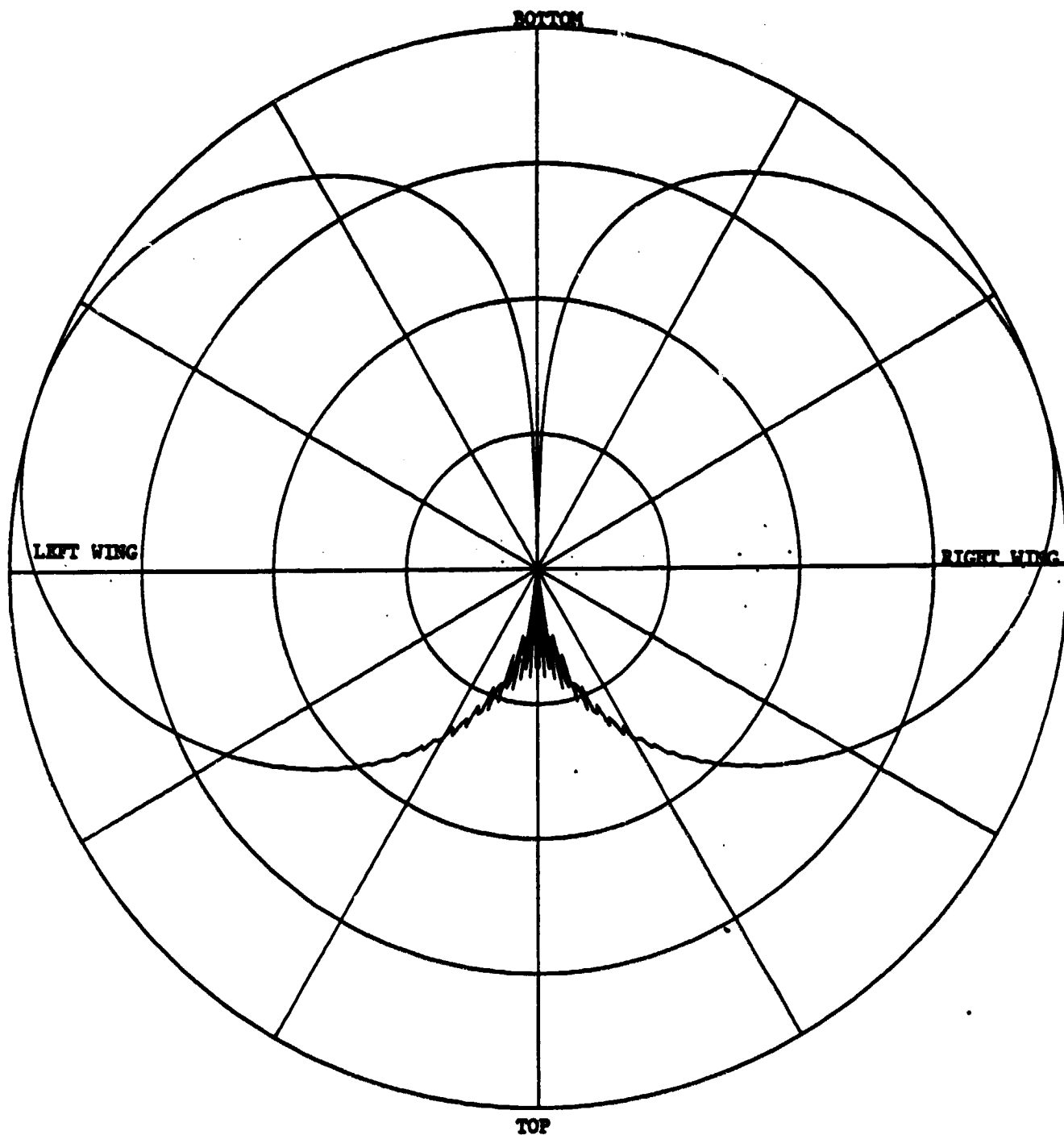


Figure II.69-3. Beechcraft Duke B60. Roll plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

PG  
21.87 29.26 34.60 29.26  
0. 0. 0.  
PG  
4 T  
-21.054 17.864 12.122  
-16.588 28.058 29.986  
-16.588 28.058 105.27  
-21.054 17.864 111.012  
PG  
5 F  
-16.588 28.058 29.986  
-16.588 28.058 -22.33  
-.638 58.058 -22.33  
-.638 58.058 105.27  
-16.588 28.058 105.27  
PG  
4 F  
-.638 58.058 -22.33  
3.828 98.89 -22.33  
3.828 98.89 99.528  
-.638 58.058 105.27  
PG  
5 F  
-13.398 98.89 99.528  
3.828 98.89 99.528  
3.828 98.89 -22.33  
-13.398 98.89 -22.33  
-13.398 98.89 32.538  
PG  
4 F  
-13.398 98.89 32.538  
-.638 233.508 41.47  
-.638 233.508 76.56  
-13.398 98.89 99.528  
PG  
4 T  
-21.054 -17.864 111.012  
-16.588 -58.058 105.27  
-16.588 -58.058 29.986  
-21.054 -17.864 12.122  
PG  
5 F  
-16.588 -58.058 105.27  
-.638 -58.058 105.27  
-.638 -58.058 -22.33  
-16.588 -58.058 -22.33  
-16.588 -58.058 29.986  
PG

4 F  
-.638 -58.058 105.27  
3.828 -98.89 99.528  
3.828 -98.89 -22.33  
-.638 -58.058 -22.33  
PG  
5 F  
-13.398 -98.89 32.538  
-13.398 -98.89 -22.33  
3.828 -98.89 -22.33  
3.828 -98.89 99.528  
-13.398 -98.89 99.528  
PG  
4 F  
-13.398 -98.89 99.528  
-.638 -233.508 76.56  
-.638 -233.508 41.47  
-13.398 -98.89 32.538  
SG  
1  
0. 45.936  
0. 0. 0. .22 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000, 5.2  
PP  
3.75 3  
EX

Figure II.70-1. Beechcraft Duke B60. Data set for antenna location 5.

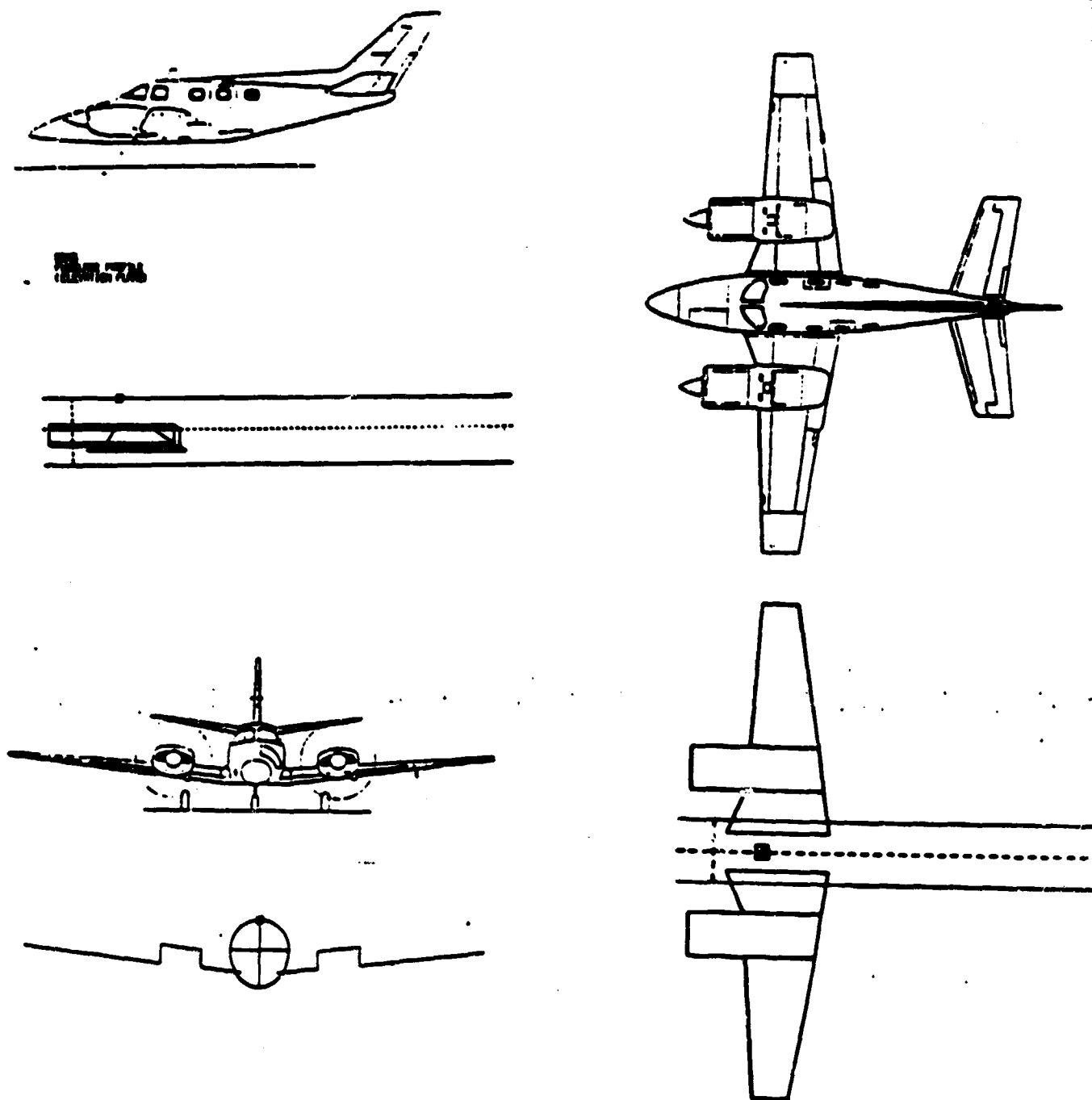


Figure II.70-2. Beechcraft Duke B60. Top front  $1/4$  wavelength monopole antenna above cockpit for antenna location 5.

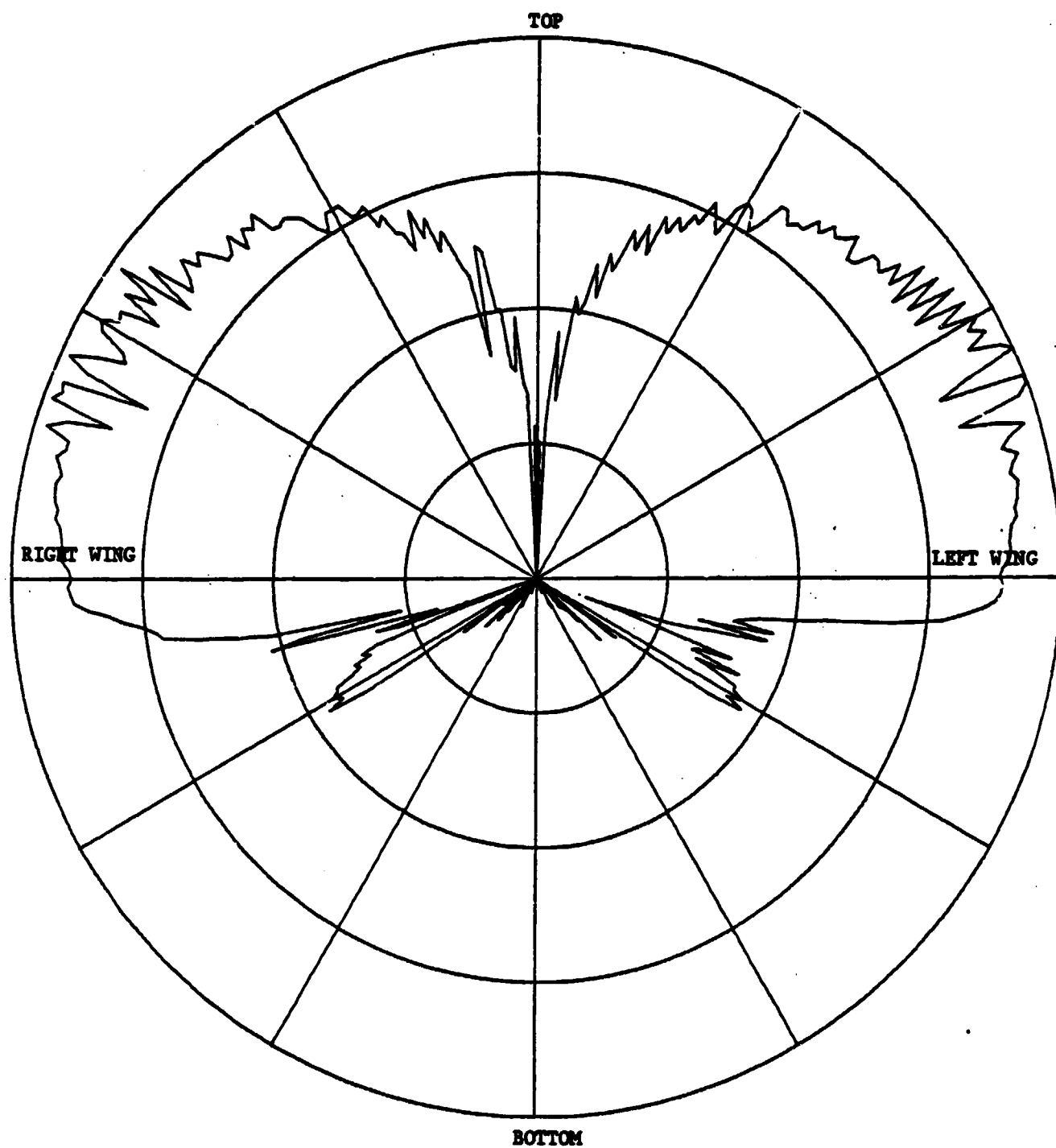


Figure II.70-3. Beechcraft Duke B60. Roll plane pattern for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG

10. 21. 13. 21.

0. 0. 0.

PC

4 F

0. 58.058 -21.692

16.588 58.058 -21.692

10.588 58.058 105.27

0. 58.058 105.27

PC

6 F

19.16 85.492 -21.692

20.416 98.89 -21.692

20.416 98.89 98.89

16.588 58.058 105.27

16.588 58.058 -21.692

17.784 70.818 -21.692

PC

4 F

20.416 98.89 98.89

20.416 98.89 -21.692

3.828 98.89 -21.692

3.828 98.89 98.89

PC

4 F

16.588 58.058 -21.692

0. 58.058 -21.692

3.828 98.89 -21.692

20.416 98.89 -21.692

PC

3 F

17.784 70.818 -21.692

10.208 78.474 -47.85

19.16 85.492 -21.692

PC

3 F

2.552 72.094 -20.416

10.208 78.474 -47.85

17.784 70.818 -21.692

SG

1

0. -28.71

0. 0. 0. .25 3

1. 0.

PD

0. 0. 90.

0 360 1

50000. 5.2

PE

3.75 3

EX

Figure II.71-1. Beechcraft Duke B60. Data set for antenna location 6.



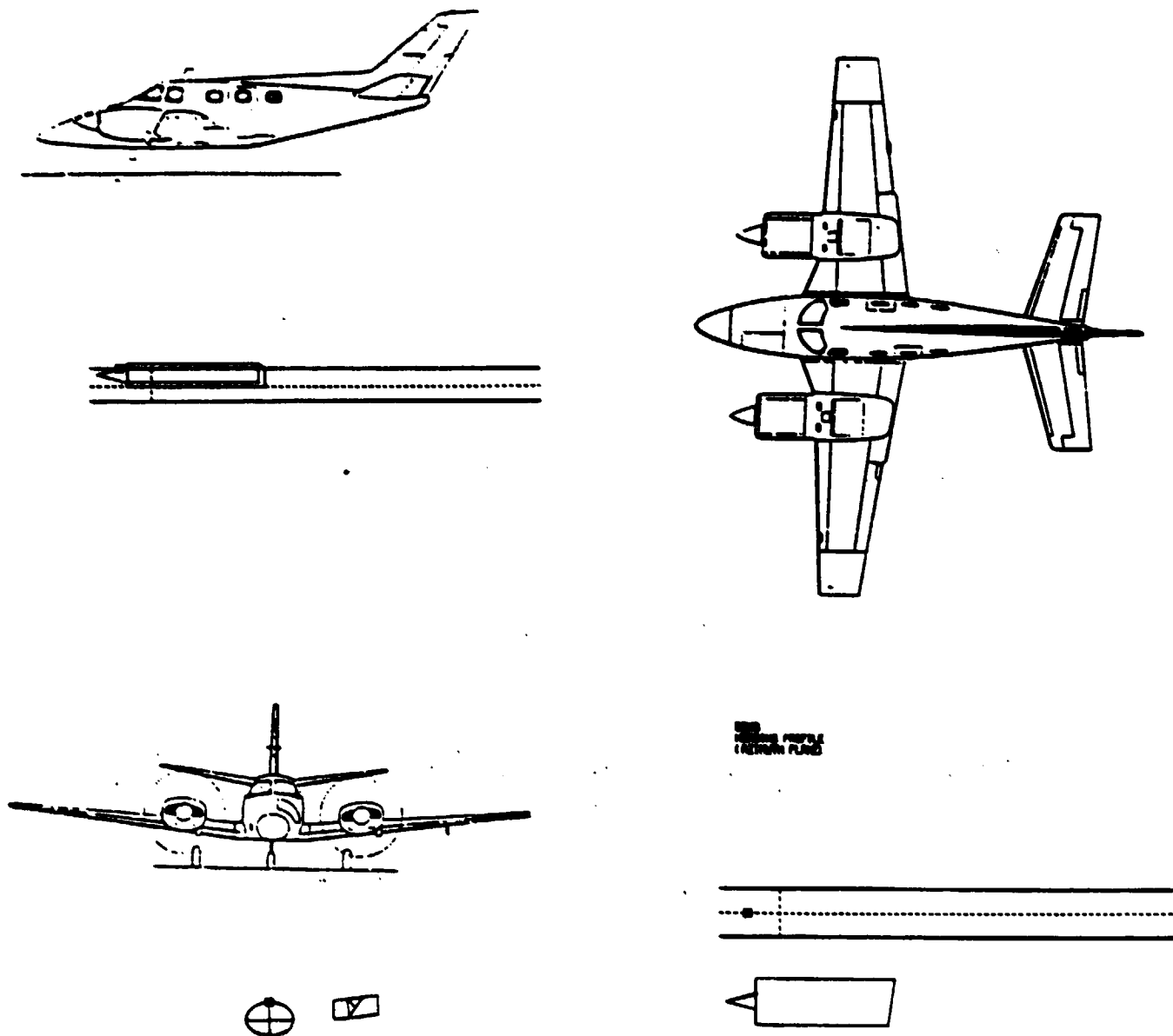


Figure II.71-2. Beechcraft Duke B60. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 6.

E-PHI  
DB PLOT

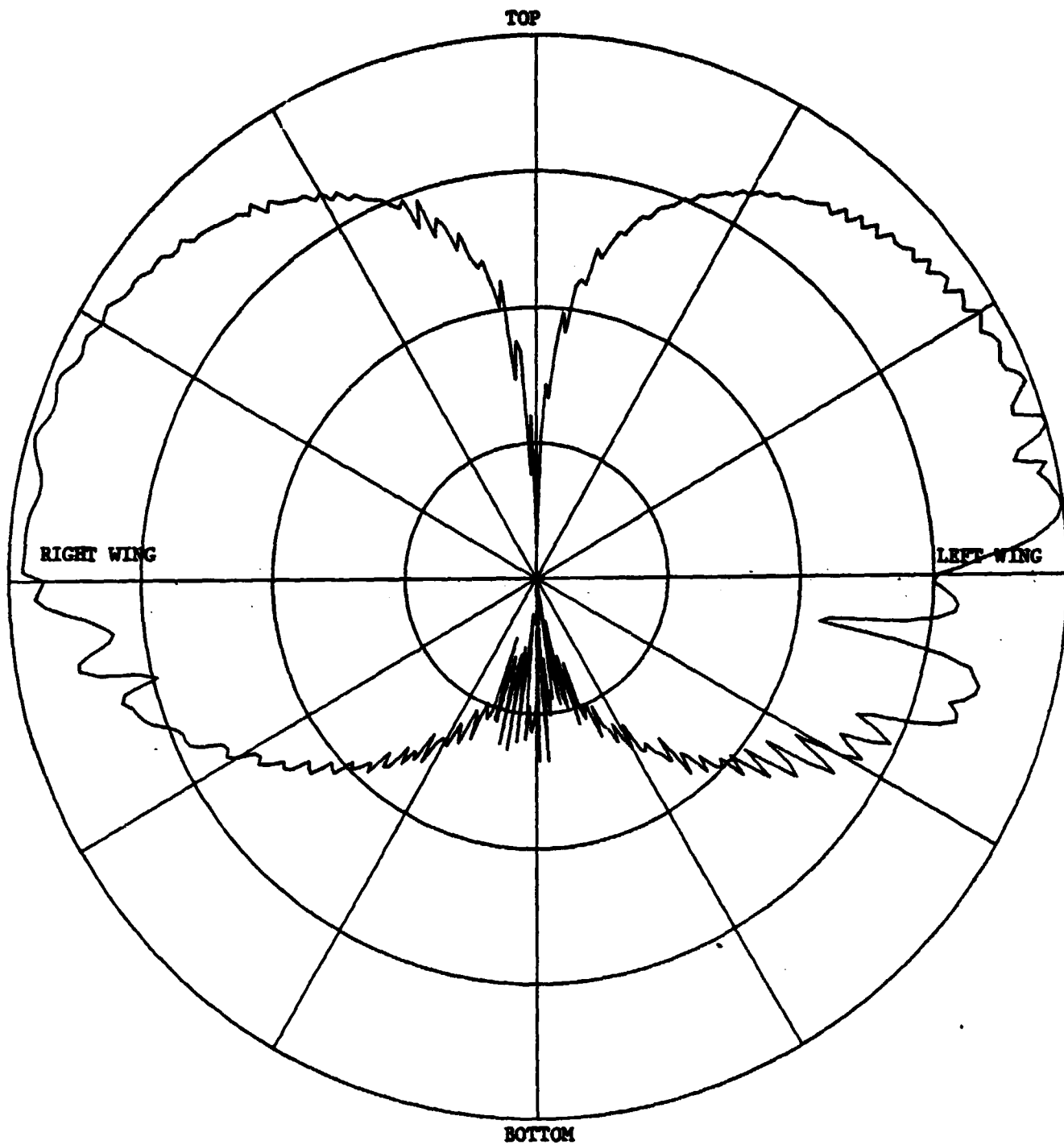


Figure II.71-3. Beechcraft Duke B60. Roll plane pattern for antenna location 6.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
22. 22.5 25. 22.5  
0. 0. 0.  
SG  
1  
0. -34.452  
0. 0. 0. .25 3  
1. 0.  
PN  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.72-1. Beechcraft Duke B60. Data set for antenna location 7.

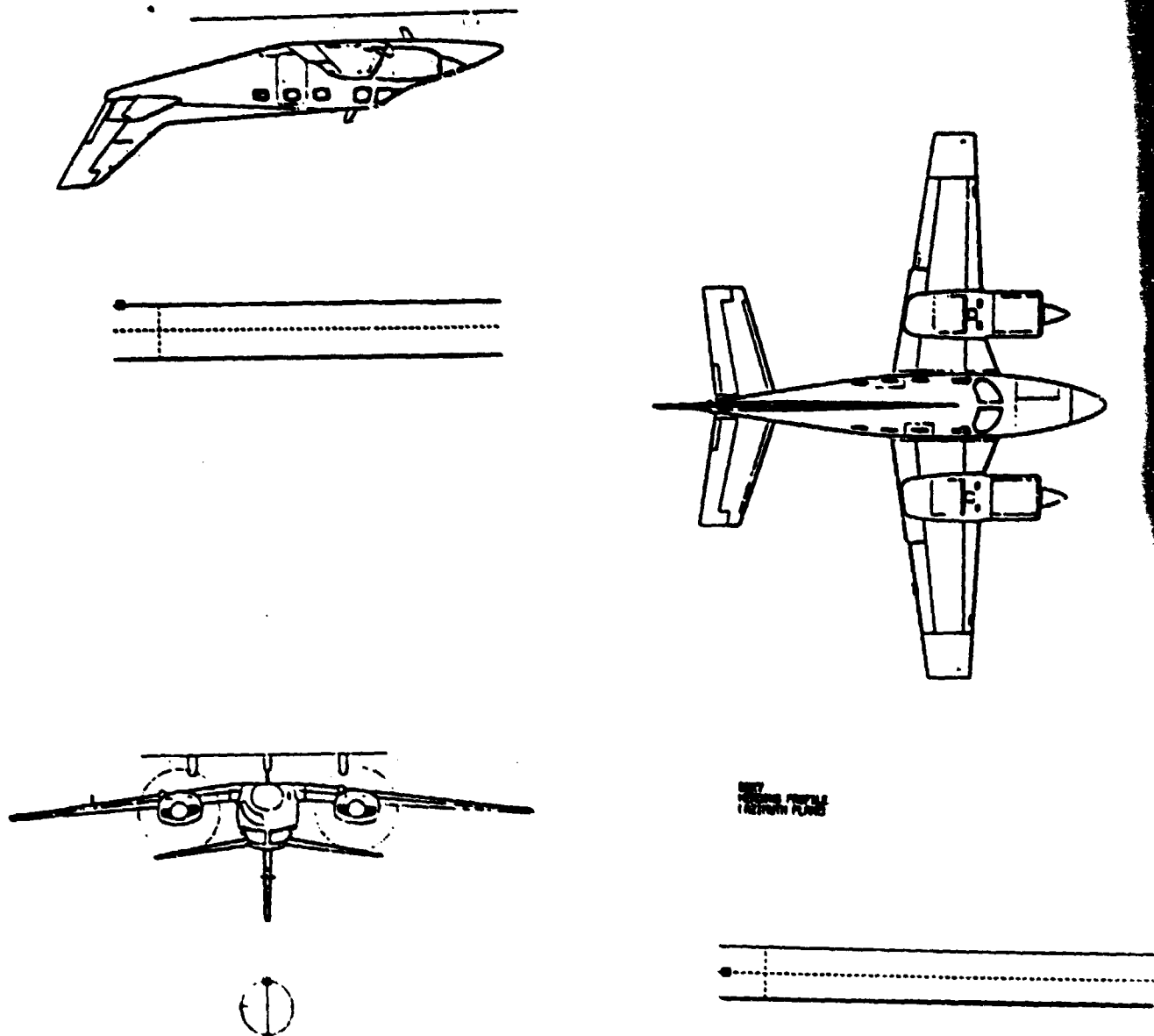


Figure II.72-2. Beechcraft Duke B60. Bottom rear 1/4 wavelength monopole antenna for antenna location 7.

E-PHI  
DB PLOT

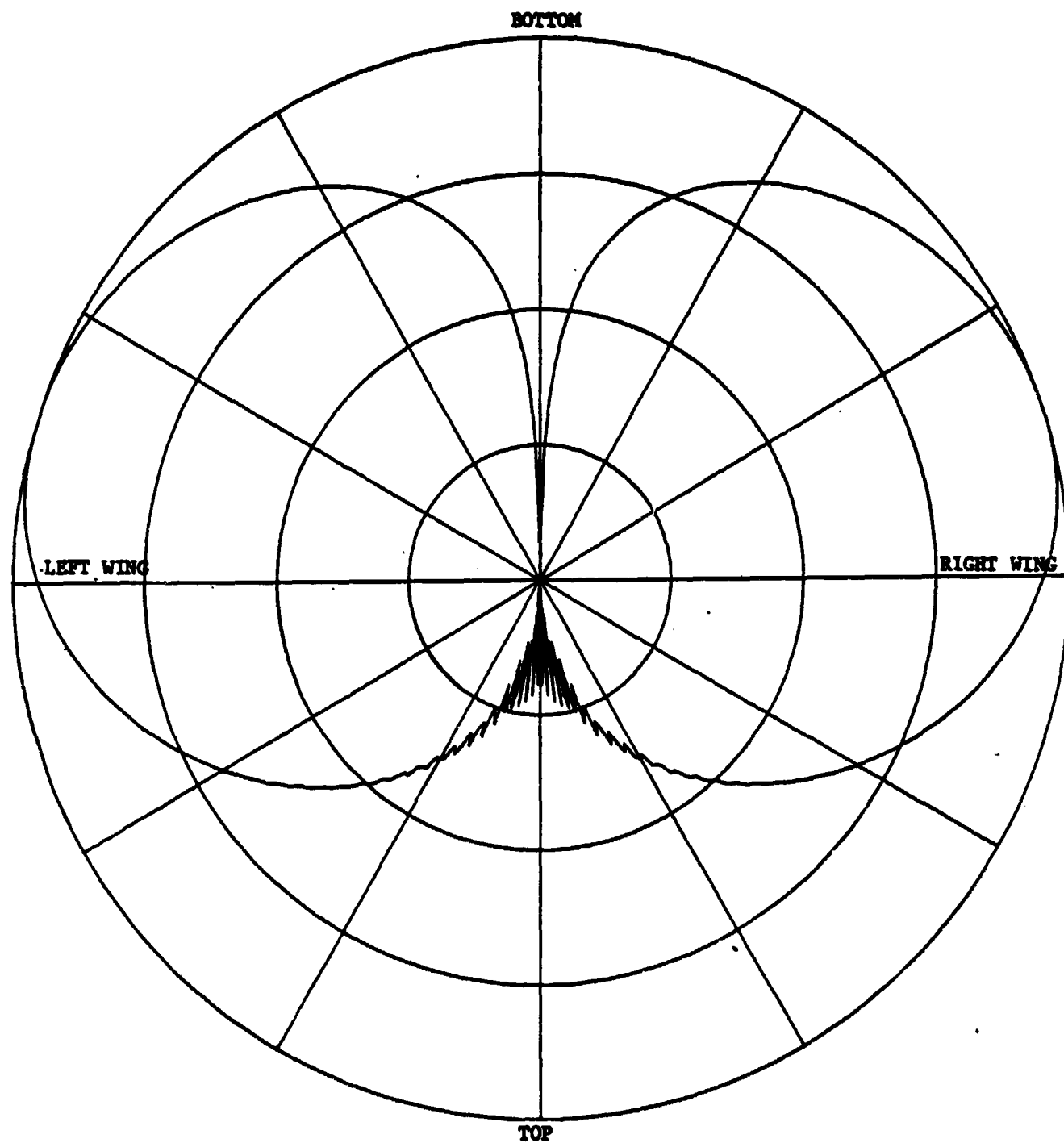


Figure II.72-3. Beechcraft Duke B60. Roll plane pattern for antenna location 7.

#### II.8. Rockwell Commander 700

Roll plane patterns are calculated for seven particular antenna locations of this aircraft.

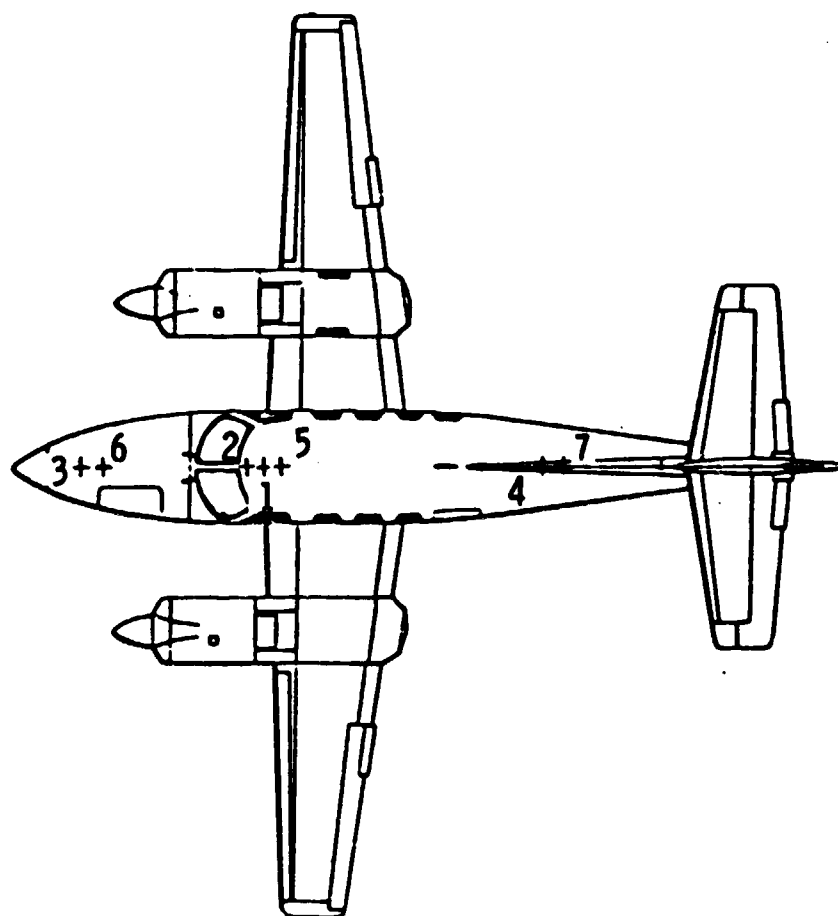
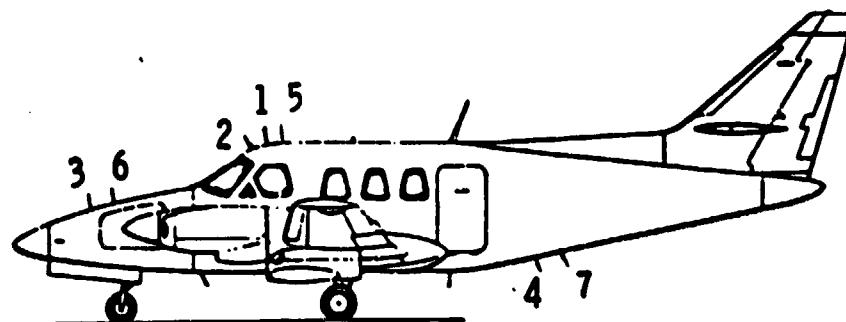


Figure II.73. Rockwell Commander 700. Antenna locations.

ORIGINAL PAGE IS  
OF POOR QUALITY

PG  
10.00 33.5 86.12 33.5  
0. 0. 0.

PG  
4 T  
-46.8 22.32 44.64  
-41.04 72.72 46.8  
-41.04 72.72 118.8  
-46.8 22.32 126.72

PG  
5 F  
-41.04 72.72 46.8  
-41.04 72.72 -10.08  
-24.48 70.56 -10.08  
-24.48 70.56 118.8  
-41.04 72.72 118.8

PG  
4 F  
-24.48 70.56 -10.08  
-20.16 112.32 -10.08  
-20.16 112.32 113.04  
-24.48 70.56 118.8

PG  
5 F  
-36.72 115.2 113.04  
-20.16 112.32 113.04  
-20.16 112.32 -10.08  
-36.72 115.2 -10.08  
-36.72 115.2 50.4

PG  
4 F  
-36.72 115.2 50.4  
-20.16 257.04 56.88  
-20.16 257.04 92.16  
-36.72 115.2 113.04

PG  
4 T  
-46.8 -22.32 126.72  
-41.04 -72.72 118.8  
-41.04 -72.72 46.8  
-46.8 -22.32 44.64

PG  
5 F  
-41.04 -72.72 118.8  
-24.48 -70.56 118.8  
-24.48 -70.56 -10.08  
-41.04 -72.72 -10.08  
-41.04 -72.72 46.8

PG

4 F  
-24.48 -70.56 118.8  
-20.16 -112.32 113.04  
-20.16 -112.32 -10.08  
-24.48 -70.56 -10.08

PG  
5 F  
-36.72 -115.2 50.4  
-36.72 -115.2 -10.08  
-20.16 -112.32 -10.08  
-20.16 -112.32 113.04  
-36.72 -115.2 113.04

PG  
4 F  
-36.72 -115.2 113.04  
-20.16 -257.04 92.16  
-20.16 -257.04 56.88  
-36.72 -115.2 50.4

SG  
1  
0. 39.6  
0. 0. 0. 25 3  
1. 0.

PD  
0. 0. 0.  
0 360 1  
50000. 5.2

PP  
3.75 3  
FX

Figure II.74-1. Rockwell Commander 700. Data set for  
antenna location 1.



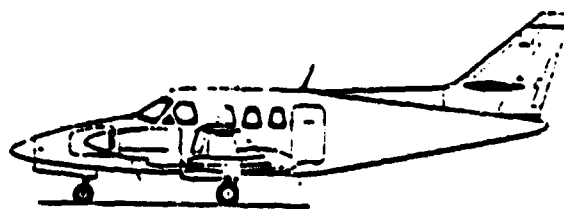


FIGURE 74-2

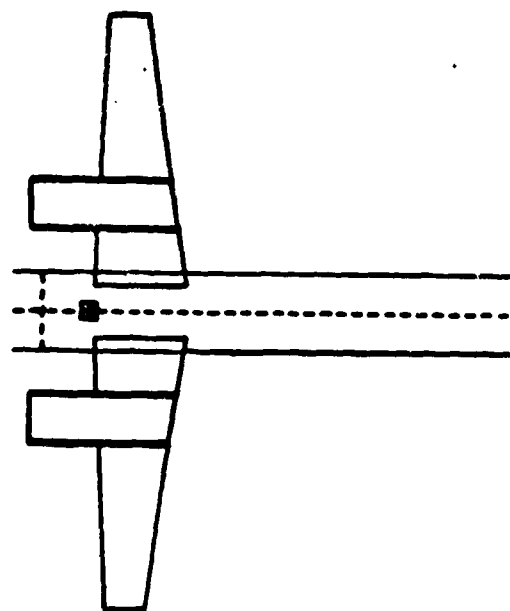
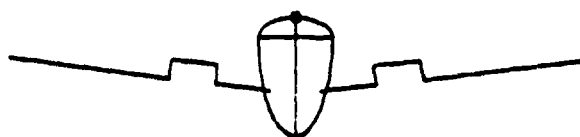
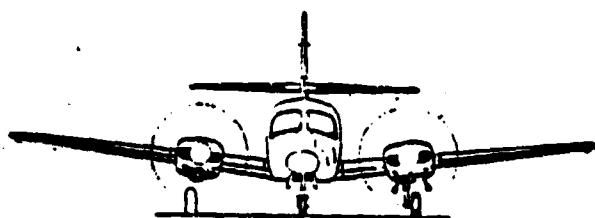
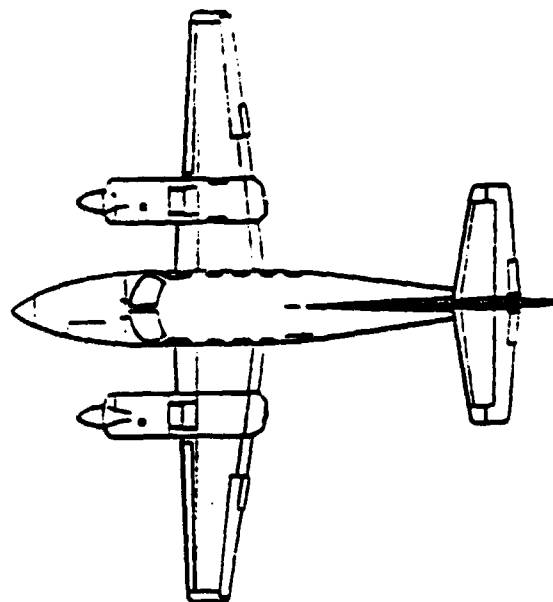
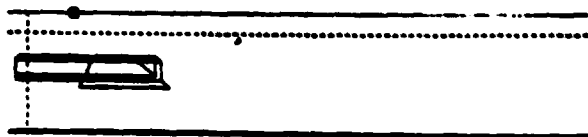


Figure II.74-2. Rockwell Commander 700. Top front  $1/4$  wavelength monopole antenna above cockpit for antenna location 1.

E-PHI  
DB PLOT

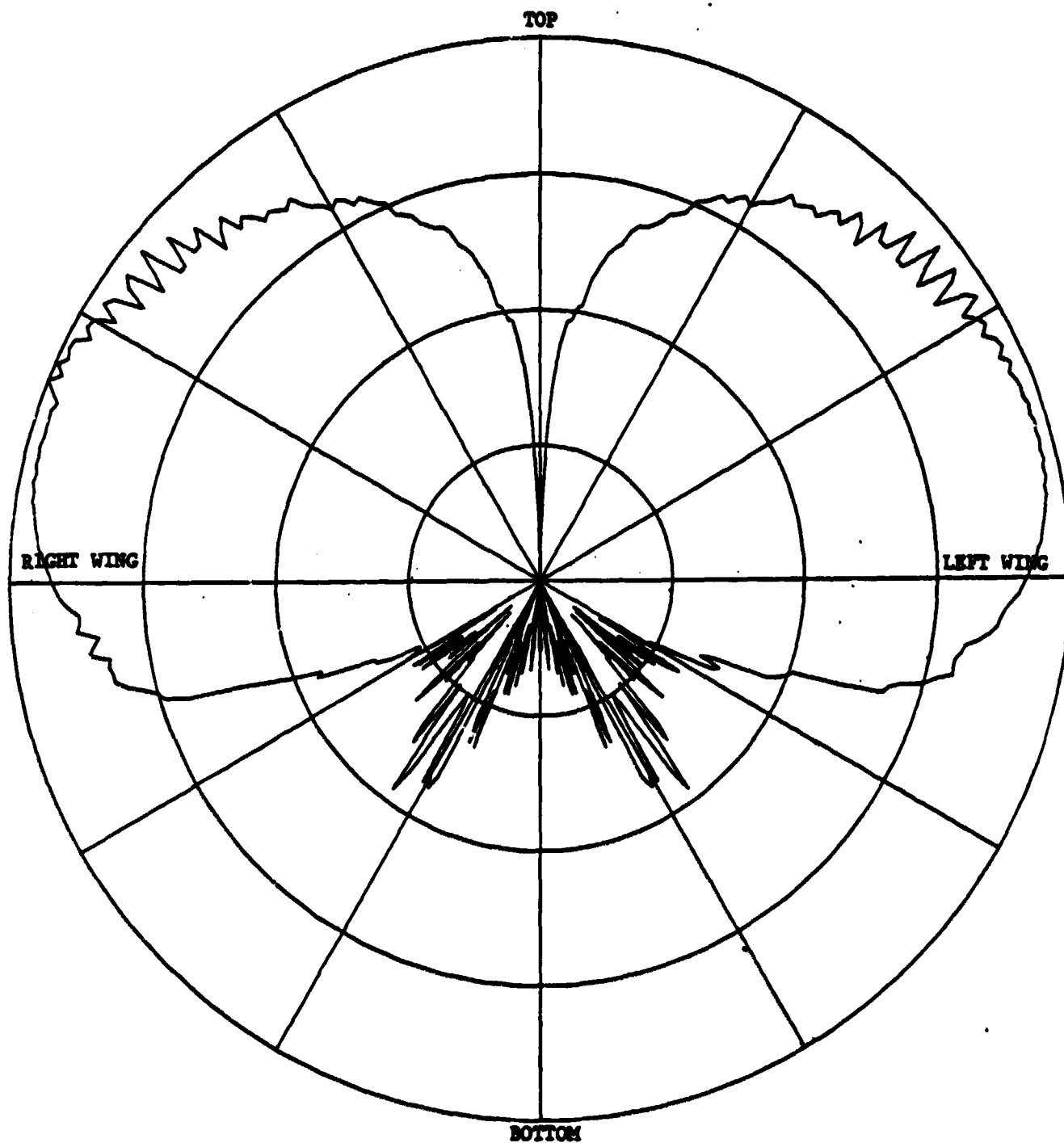


Figure II.74-3. Rockwell Commander 700. Roll plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

PG  
10.90 33.5 86.12 33.5  
0. 0. 0.

PG  
4 T  
-46.8 22.32 44.64  
-41.04 72.72 46.8  
-41.04 72.72 118.8  
-46.8 22.32 126.72

PG  
5 F  
-41.04 72.72 46.8  
-41.04 72.72 -10.08  
-24.48 70.56 -10.08  
-24.48 70.56 118.8  
-41.04 72.72 118.8

PG  
4 F  
-24.48 70.56 -10.08  
-20.16 112.32 -10.08  
-20.16 112.32 113.04  
-24.48 70.56 118.8

PG  
5 I  
-36.72 115.2 113.04  
-70.16 112.32 113.04  
-20.16 112.32 -10.08  
-36.72 115.2 -10.08  
-36.72 115.2 50.4

PG  
4 F  
-36.72 115.2 50.4  
-20.16 257.04 56.68  
-20.16 257.04 92.16  
-36.72 115.2 113.04

PG  
4 T  
-46.8 -22.32 126.72  
-41.04 -72.72 118.8  
-41.04 -72.72 46.8  
-46.8 -22.32 44.64

PG  
5 F  
-41.04 -72.72 118.8  
-24.48 -70.56 118.8  
-24.48 -70.56 -10.08  
-41.04 -72.72 -10.08  
-41.04 -72.72 46.8

PG

4 F  
-24.48 -70.56 118.8  
-20.16 -112.32 113.04  
-20.16 -112.32 -10.08  
-24.48 -70.56 -10.08

PG  
5 F  
-36.72 -115.2 50.4  
-36.72 -115.2 -10.08  
-20.16 -112.32 -10.08  
-20.16 -112.32 113.04  
-36.72 -115.2 113.04

PG  
4 F  
-36.72 -115.2 113.04  
-20.16 -257.04 92.16  
-20.16 -257.04 56.68  
-36.72 -115.2 50.4

SG  
1  
0. 30.94  
0. 0. 0. 25.3  
1. 0.

PD  
0. 0. 31.  
0 360 1  
500 00. 5.2

PP  
3.75 3  
FX

Figure II.75-1. Rockwell Commander 700. Data set for  
antenna location 2.

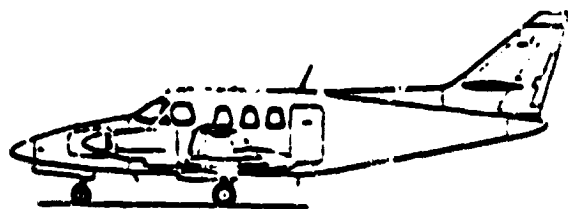


FIG. 700

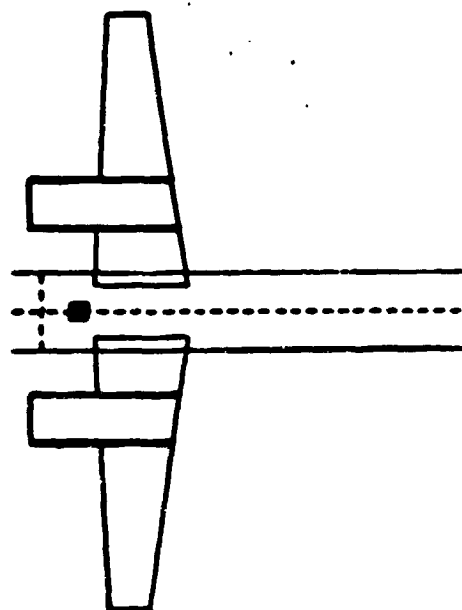
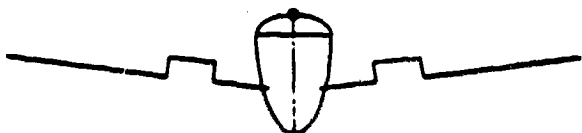
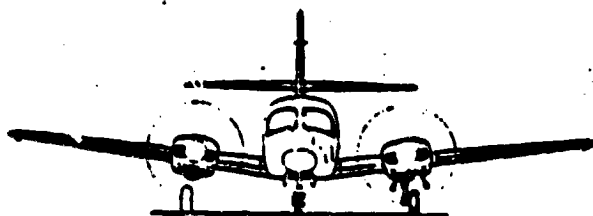
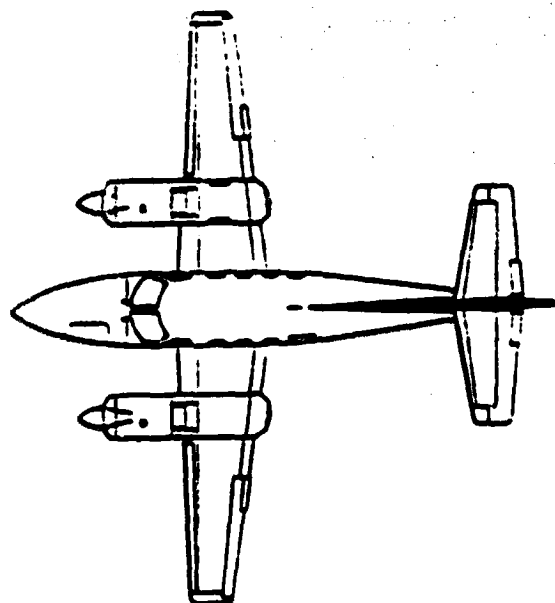
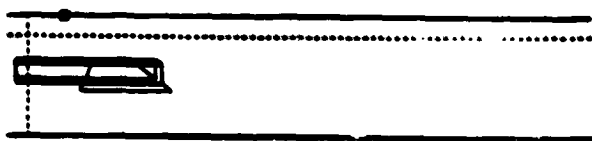


Figure II.75-2. Rockwell Commander 700. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

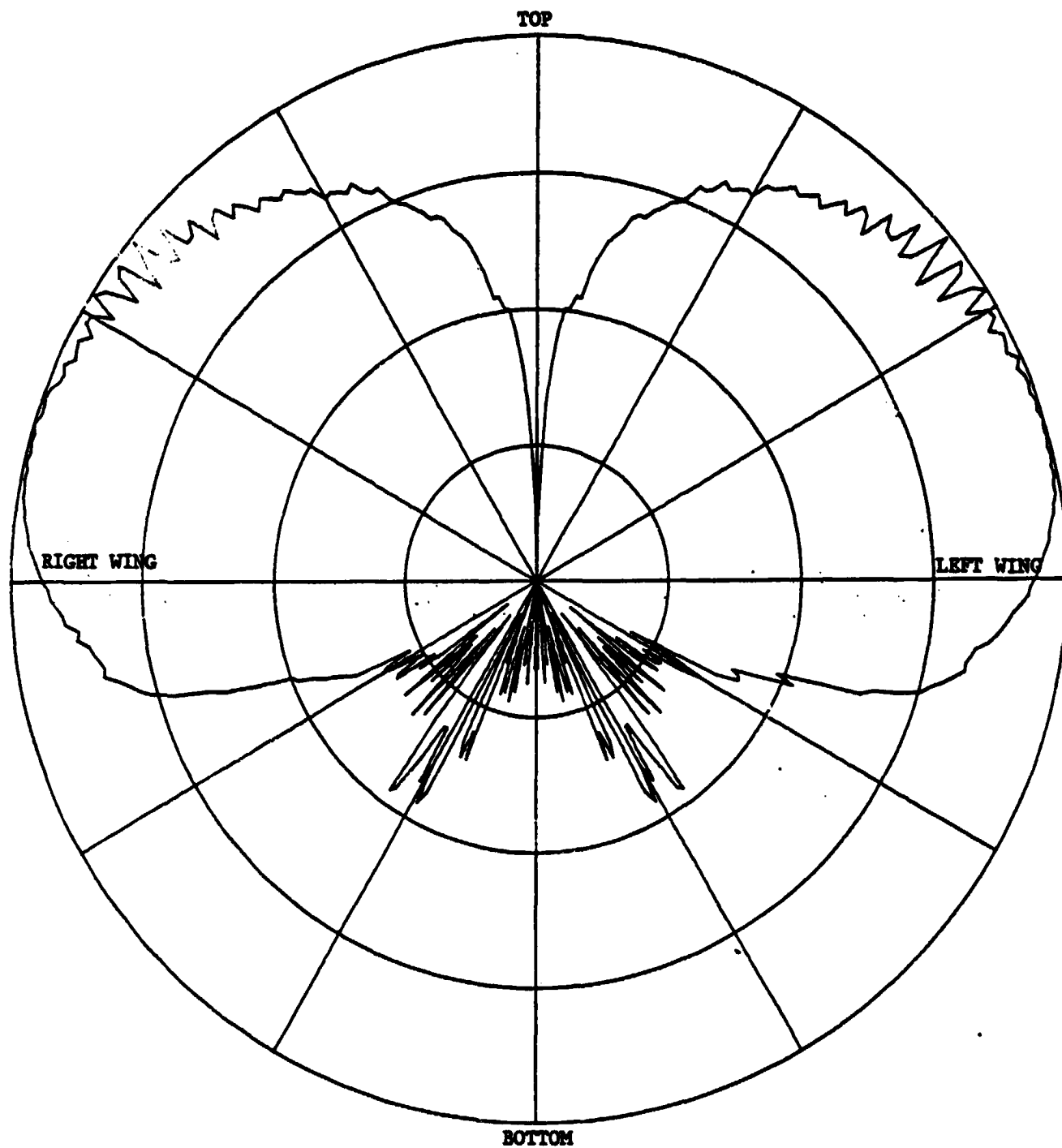


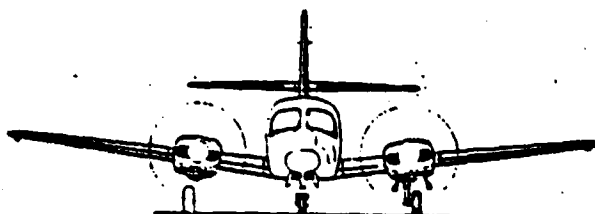
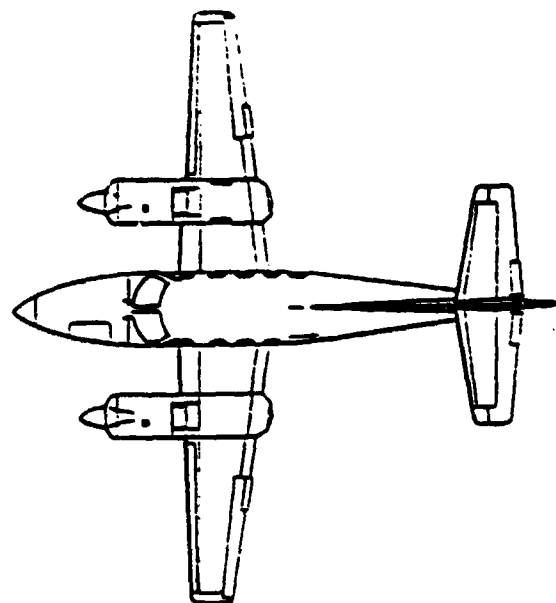
Figure II.75-3. Rockwell Commander 700. Roll plane pattern for antenna location 2.

```

FG
15.5 20.0 15.0 20.0
0. 0. 0.
CG
1
0. 39.6
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3
EX

```

Figure II.76-1. Rockwell Commander. Data set for antenna location 3.



ANTENNA LOCATION 3

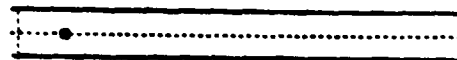


Figure II.76-2. Rockwell Commander 700. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 3.

E-PHI  
DB PLOT

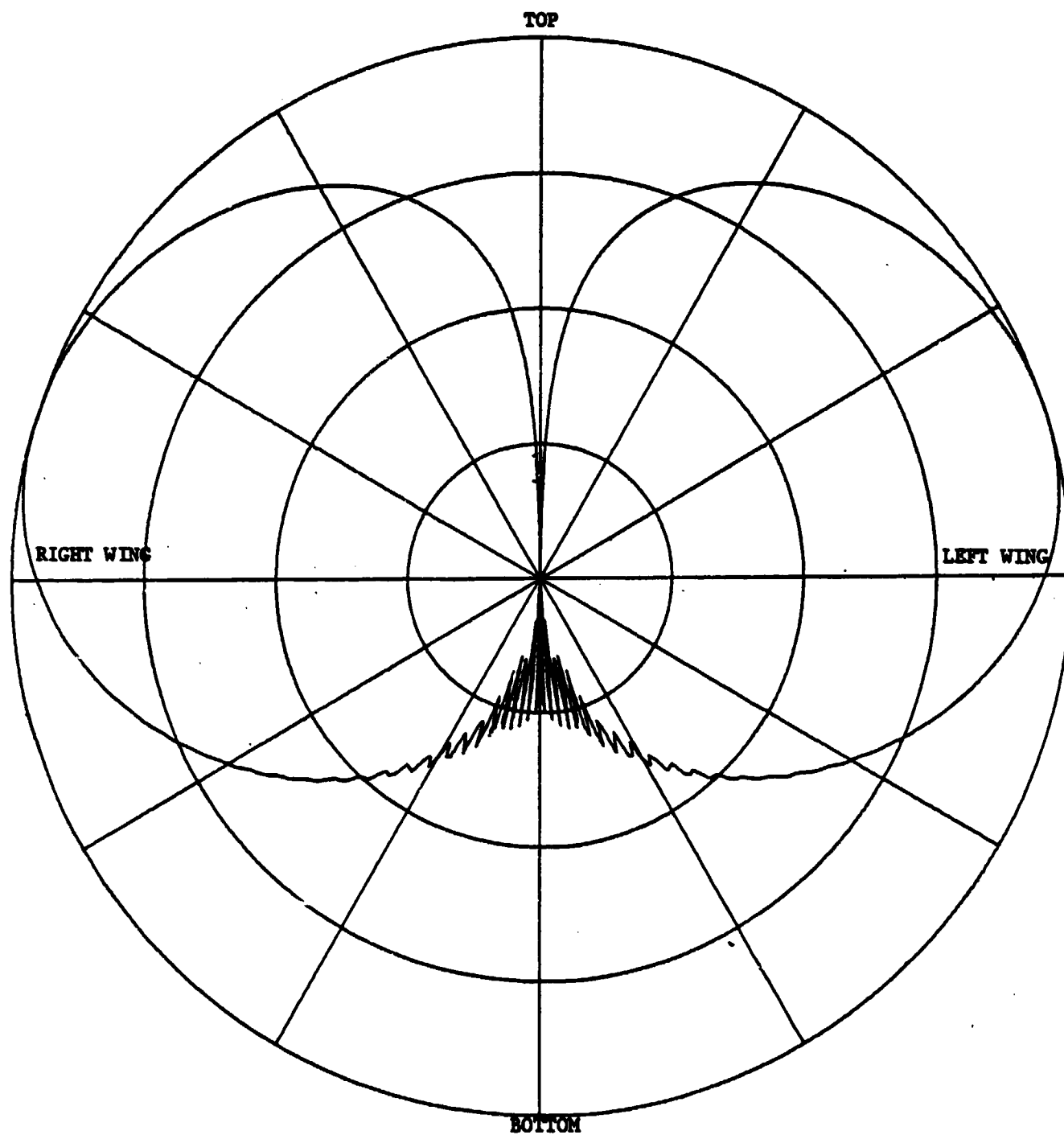


Figure II.76-3. Rockwell Commander 700. Roll plane pattern for antenna location 3.



ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
31.0 22.0 30.0 22.0  
0. 0. 0.  
CG  
1  
0. 39.6  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
U 360. 1  
00000. 5.2  
PP  
3.75 3  
FX

Figure II.77-1. Rockwell Commander 700. Data set for  
antenna location 4.

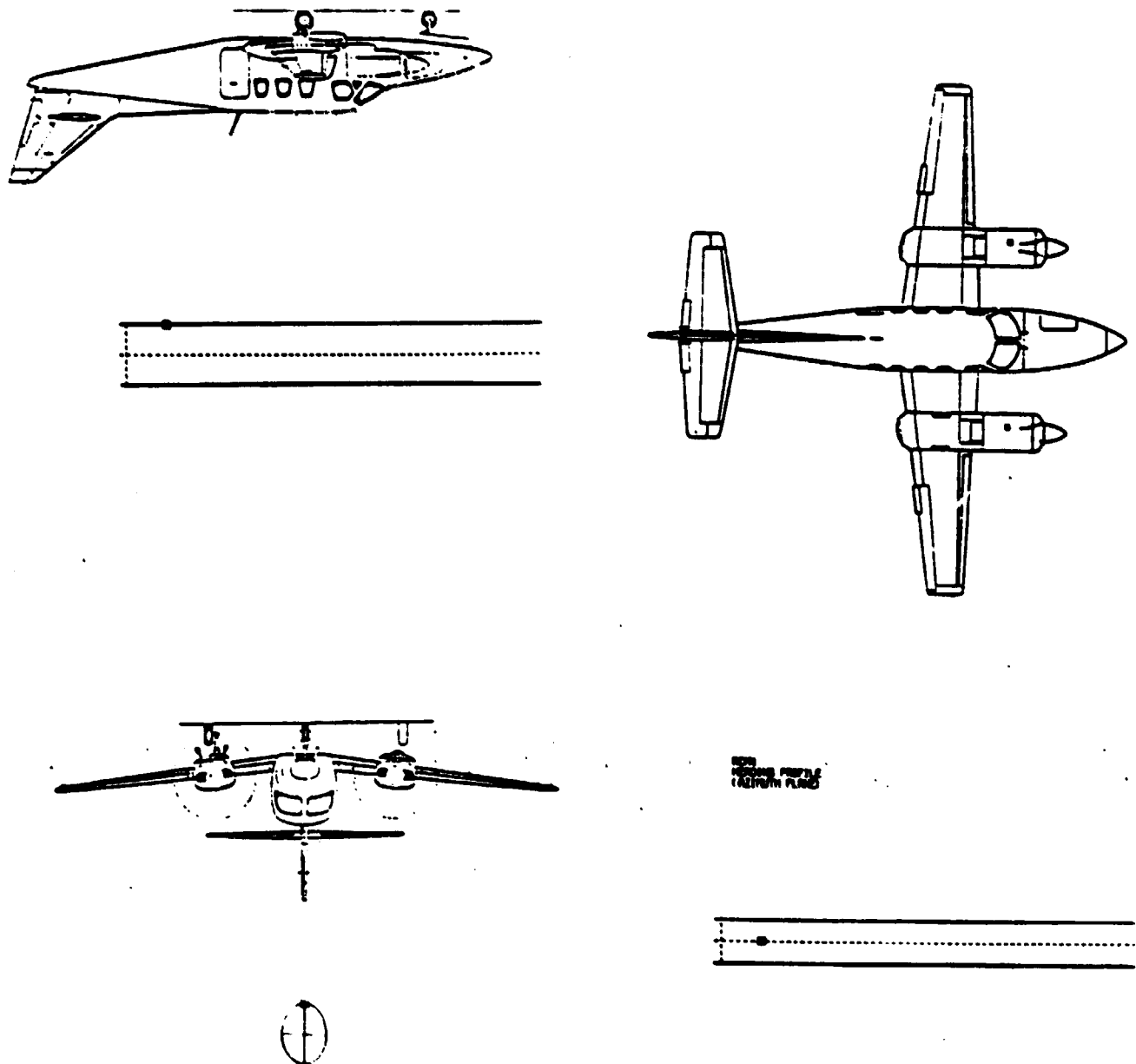


Figure II.77-2. Rockwell Commander 700. Bottom rear 1/4 wavelength monopole antenna for antenna location 4.

E-PHI  
DB PLOT

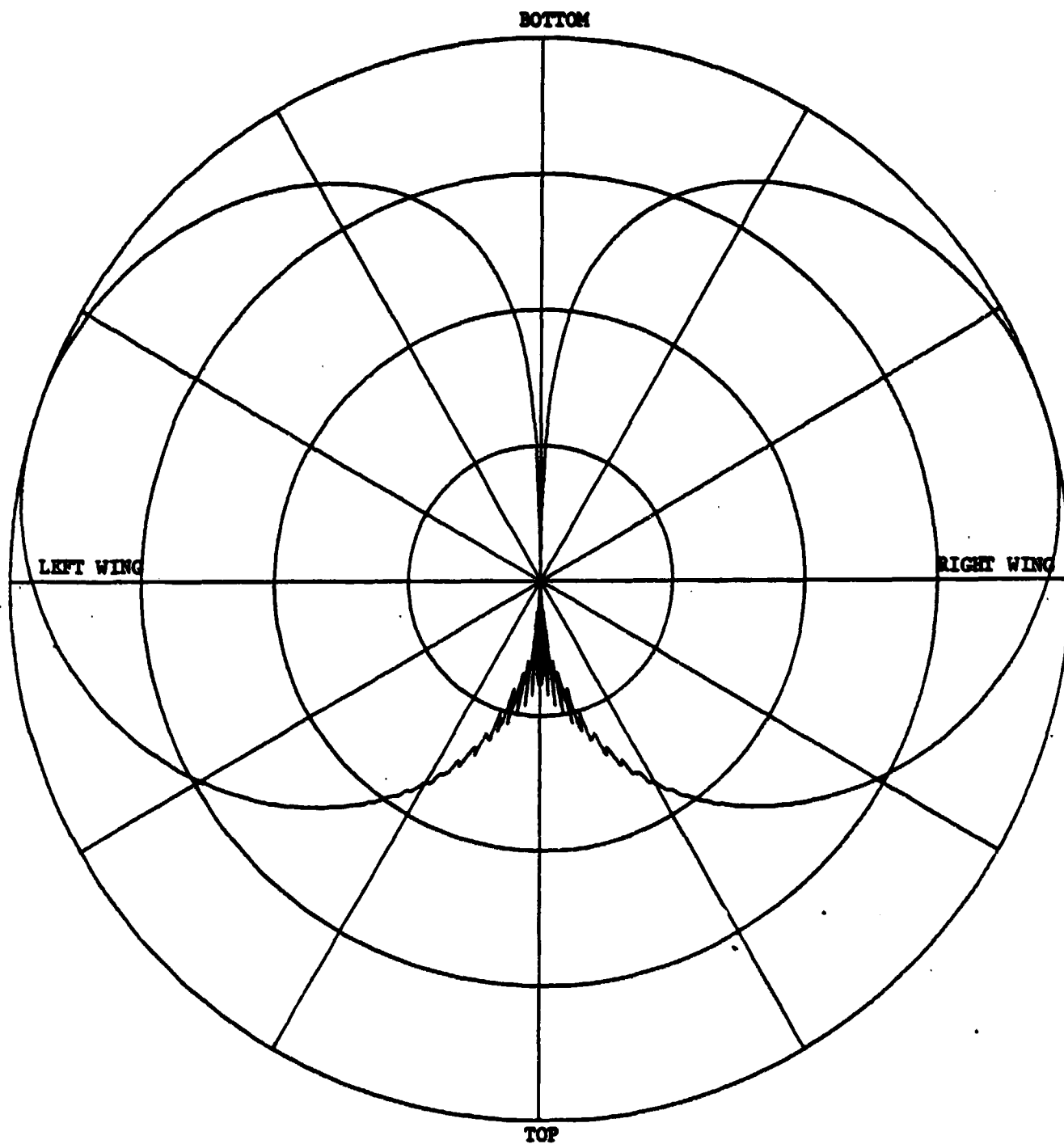


Figure II.77-3. Rockwell Commander 700. Roll plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
16.96 33.5 86.12 33.5  
0. 0. 0.

PG  
4 T  
-46.8 22.32 44.64  
-41.04 72.72 46.8  
-41.04 72.72 118.8  
-46.8 22.32 126.72

PG  
5 F  
-41.04 72.72 46.8  
-41.04 72.72 -10.08  
-24.48 70.56 -10.08  
-24.48 70.56 118.8  
-41.04 72.72 118.8

PG  
4 F  
-24.48 70.56 -10.08  
-20.16 112.32 -10.08  
-20.16 112.32 113.04  
-24.48 70.56 118.8

PG  
5 F  
-36.72 115.2 113.04  
-20.16 112.32 113.04  
-20.16 112.32 -10.08  
-36.72 115.2 -10.08  
-36.72 115.2 50.4

PG  
4 F  
-36.72 115.2 50.4  
-20.16 257.04 56.88  
-20.16 257.04 92.16  
-36.72 115.2 113.04

PG  
4 T  
-46.8 -22.32 126.72  
-41.04 -72.72 118.8  
-41.04 -72.72 46.8  
-46.8 -22.32 44.64

PG  
5 F  
-41.04 -72.72 118.8  
-24.48 -70.56 118.8  
-24.48 -70.56 -10.08  
-41.04 -72.72 -10.08  
-41.04 -72.72 46.8

PG

4 F  
-24.48 -70.56 118.8  
-20.16 -112.32 113.04  
-20.16 -112.32 -10.08  
-24.48 -70.56 -10.08

PG  
5 F  
-36.72 -115.2 50.4  
-36.72 -115.2 -10.08  
-20.16 -112.32 -10.08  
-20.16 -112.32 113.04  
-36.72 -115.2 113.04

PG  
4 F  
-36.72 -115.2 113.04  
-20.16 -257.04 92.16  
-20.16 -257.04 56.88  
-36.72 -115.2 50.4

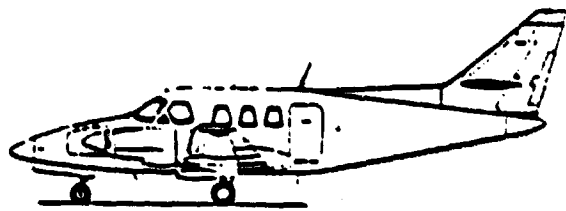
SG  
1  
0. 49.68  
0. 0. 0. .25 3  
1. 0.

PD  
0. 0. 90.  
0 360 1  
50000. 5.2

PP  
3.75 3

EX

Figure II.78-1. Rockwell Commander 700. Data set for  
antenna location 5.



700  
700-700

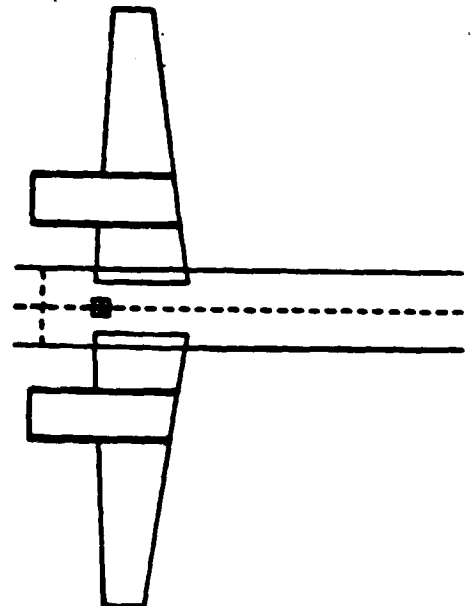
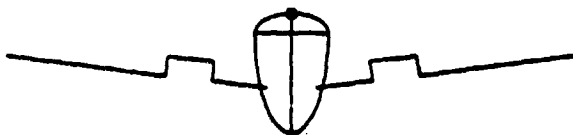
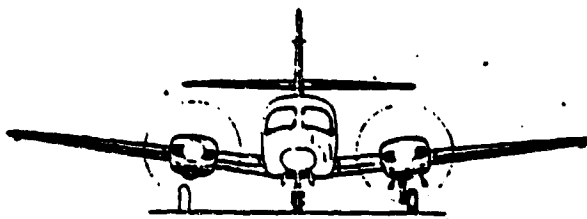
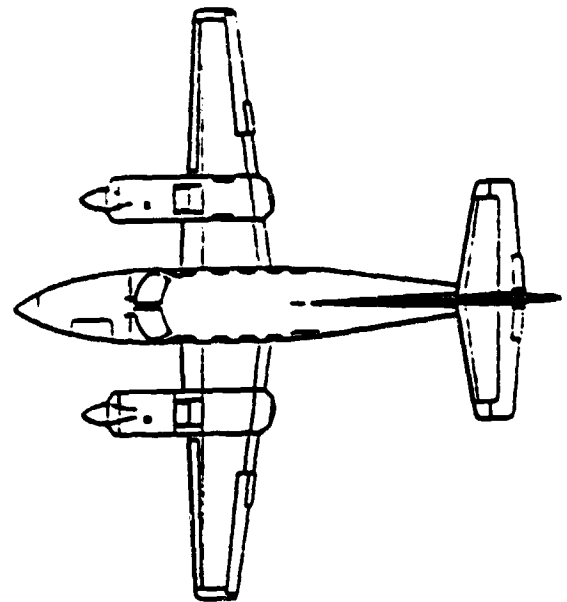


Figure II.78-2. Rockwell Commander 700. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 5.

E-PHI  
DB PLOT

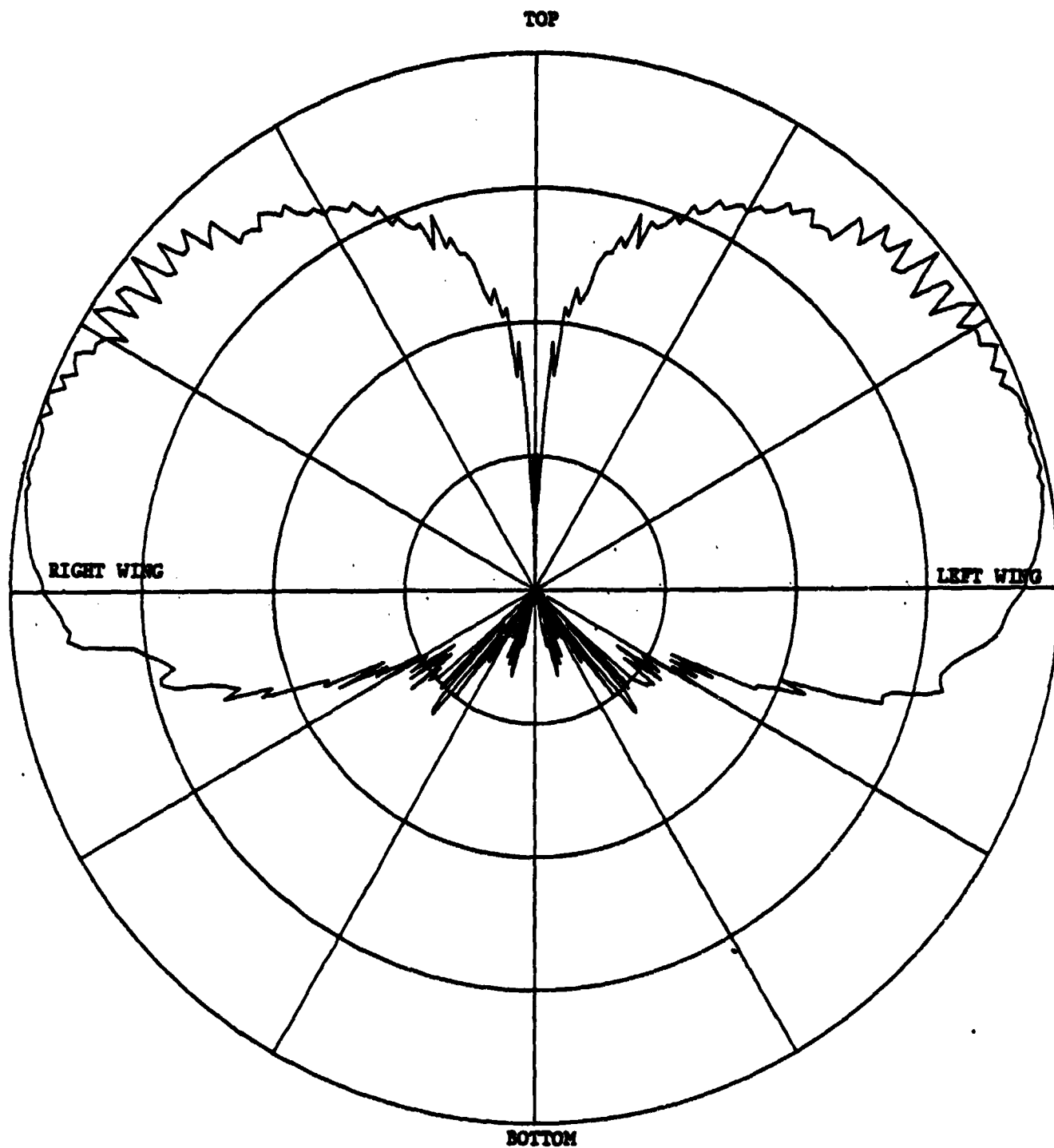
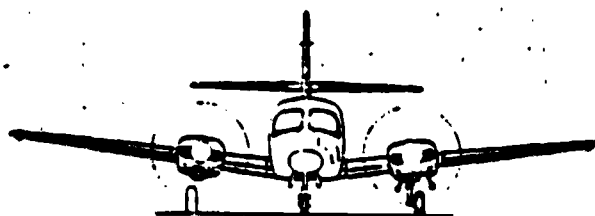
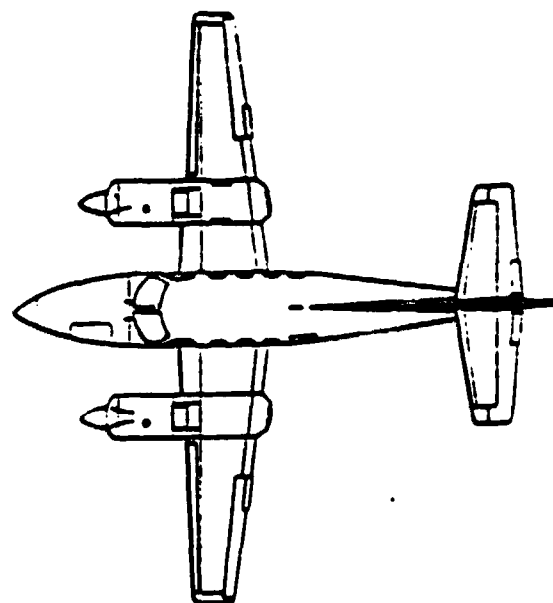
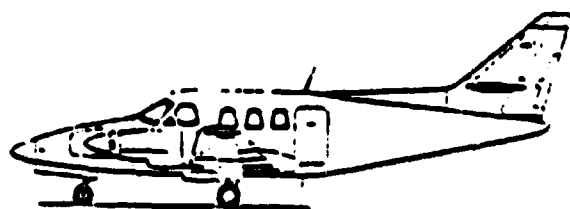


Figure II.78-3. Rockwell Commander 700. Roll plane pattern for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
16.96 24.0 19.0 24.0  
0. 0. 0.  
SG  
1  
0. 39.6  
0. 0. 0. 22.3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.79 3  
EX

Figure II.79-1. Rockwell Commander 700. Data set for  
antenna location 6.



SEE FIGURE 11.79-1 FOR ANTENNA LOCATION



Figure II.79-2. Rockwell Commander 700. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 6.



E-PHI  
DB PLOT

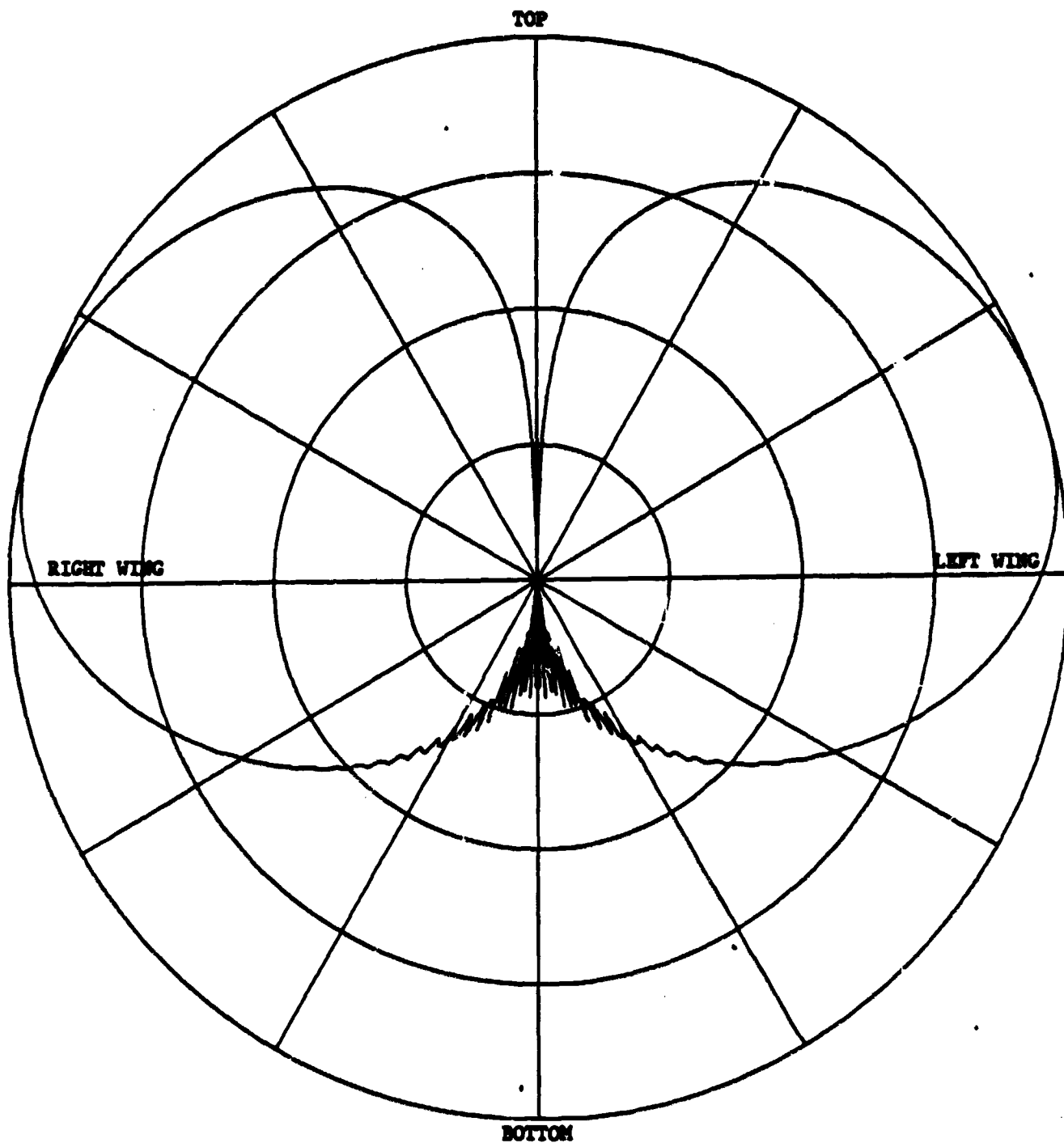
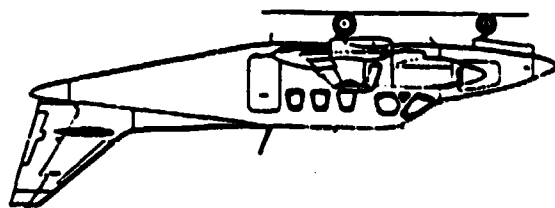


Figure II.79-3. Rockwell Commander 700. Roll plane pattern for antenna location 6.

ORIGINAL PAGE IS  
OF POOR QUALITY

PG  
20.0 20.0 27.0 20.0  
0. 0. 0.  
SC  
1  
1. 24.0  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
PX

Figure II.80-1. Rockwell Commander 700. Data set for  
antenna location 7.



SEE  
FIGURE 7.00  
(LOCATION 7.00)

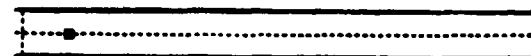
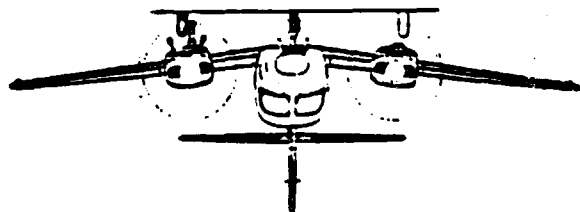
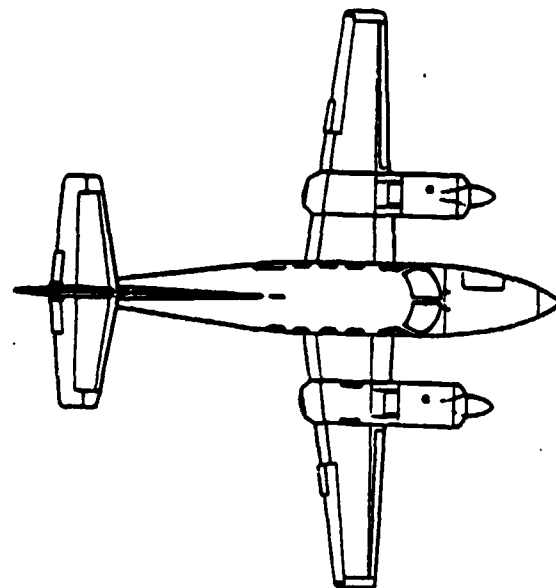
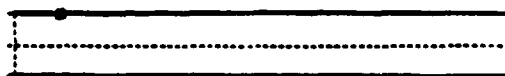


Figure II.80-2. Rockwell Commander 700. Bottom rear 1/4 wavelength monopole antenna for antenna location 7.

E-PHI  
DB PLOT

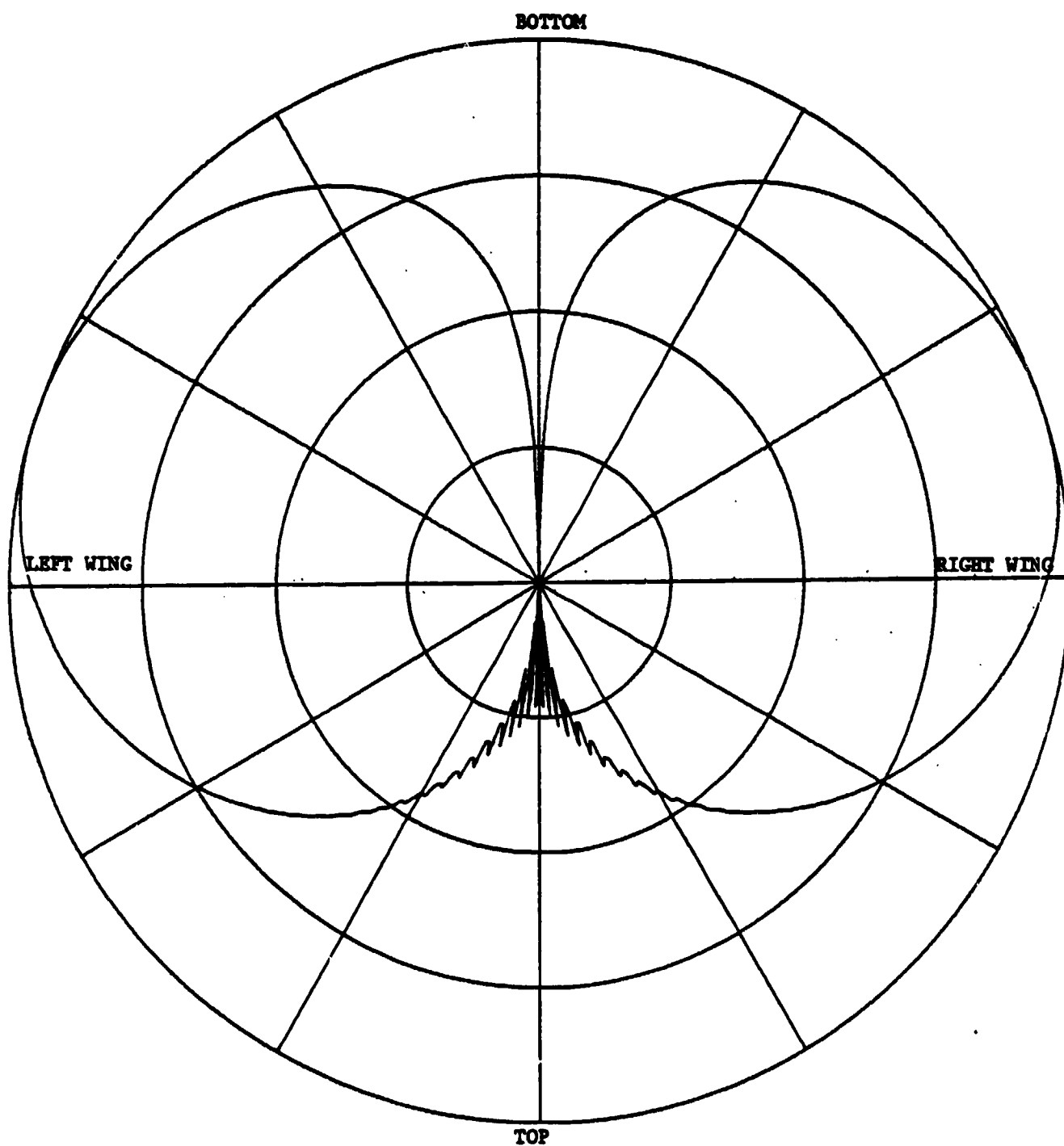


Figure II.80-3. Rockwell Commander 700. Roll plane pattern for antenna location 7.

### II.9. Cessna Citation III

Roll plane patterns are calculated for five particular antenna locations of this aircraft.

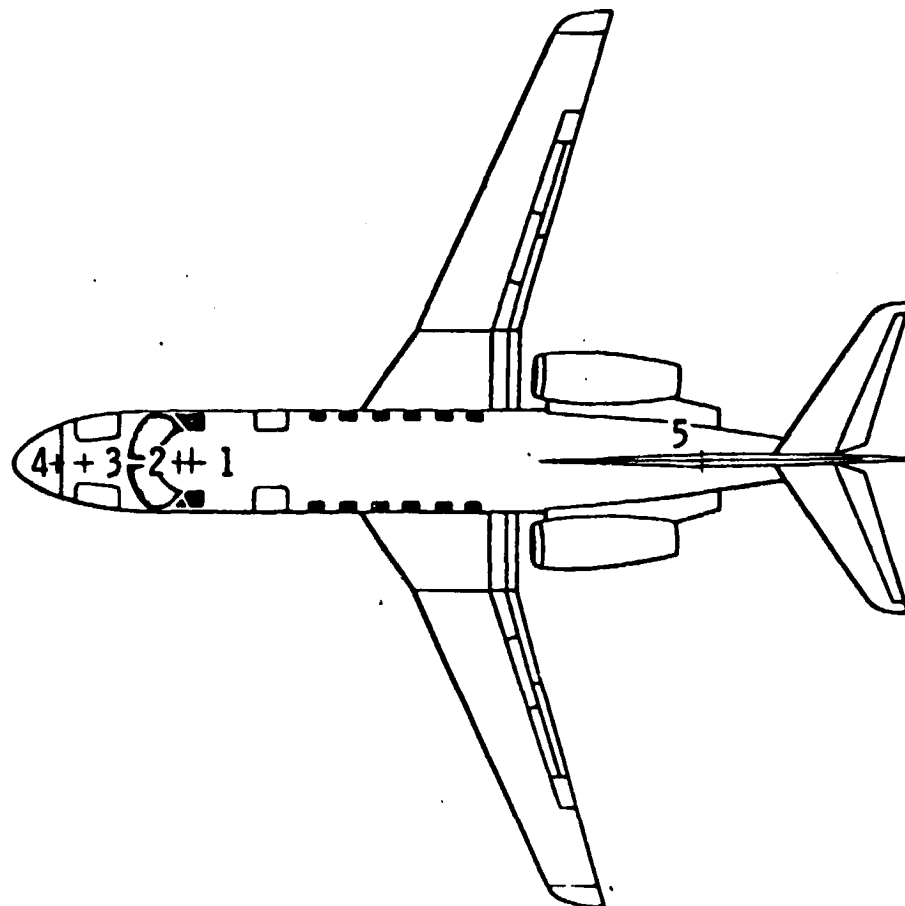
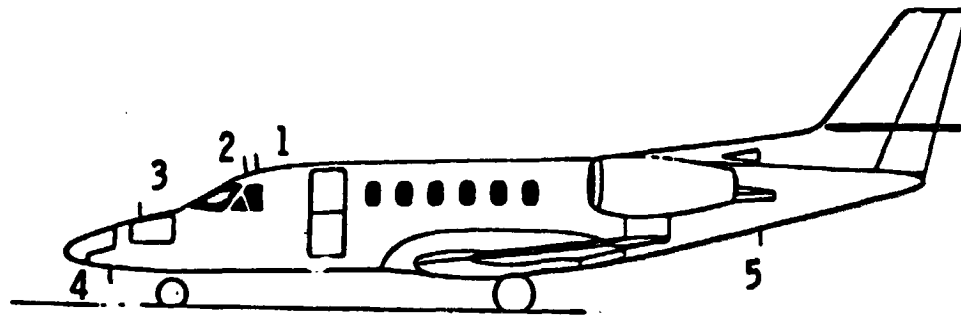


Figure II.81. Cessna Citation III. Antenna locations.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
32. 33. 32. 33.  
0. 0. 0.  
SG  
1  
0. 50.386  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.82-1. Cassna Citation II. Data set for  
antenna location 1.





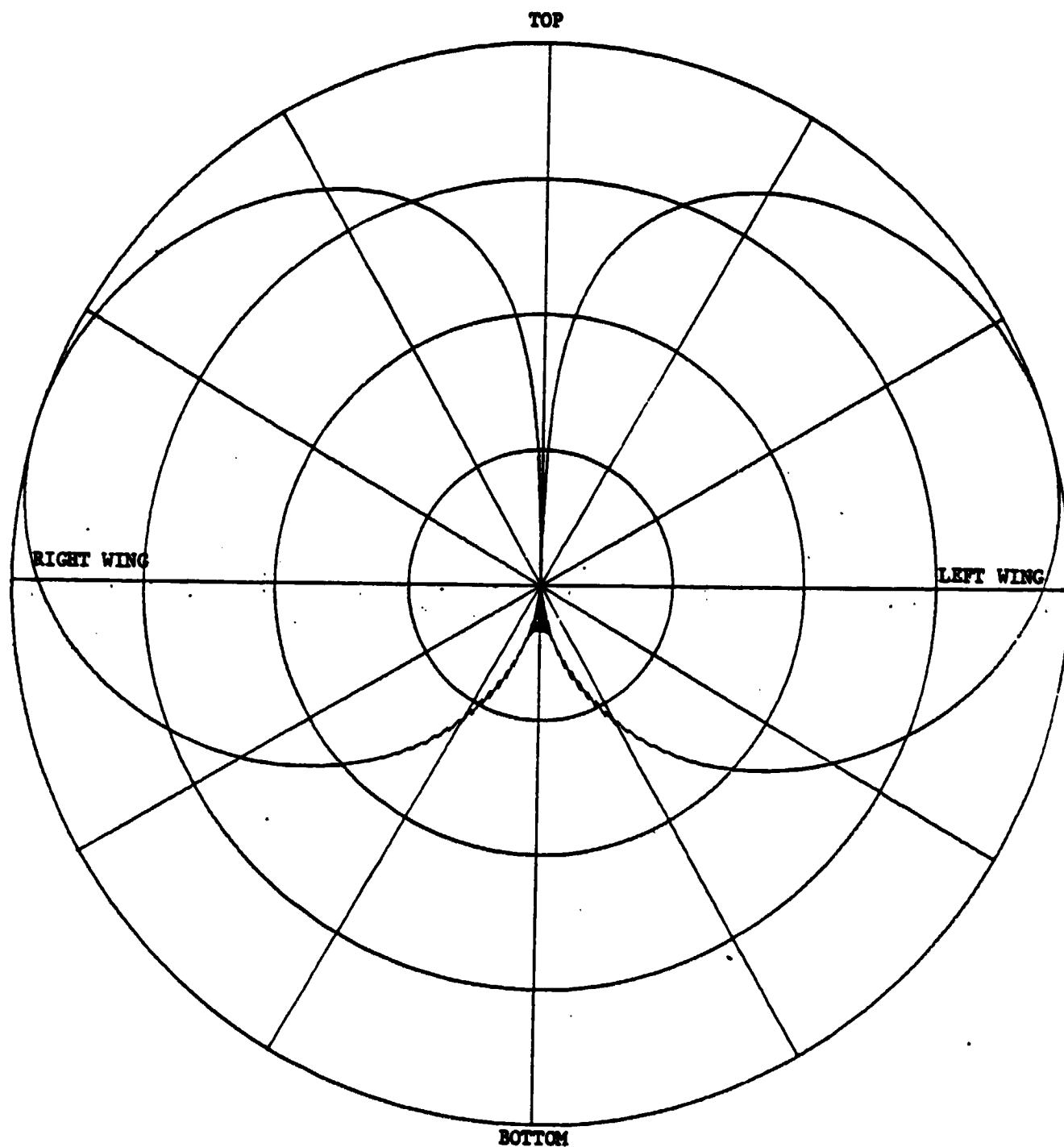
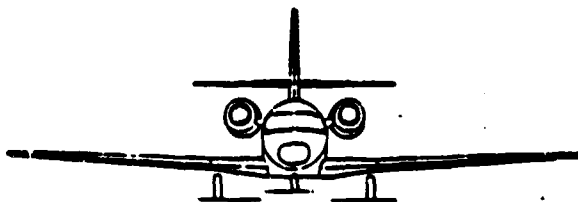
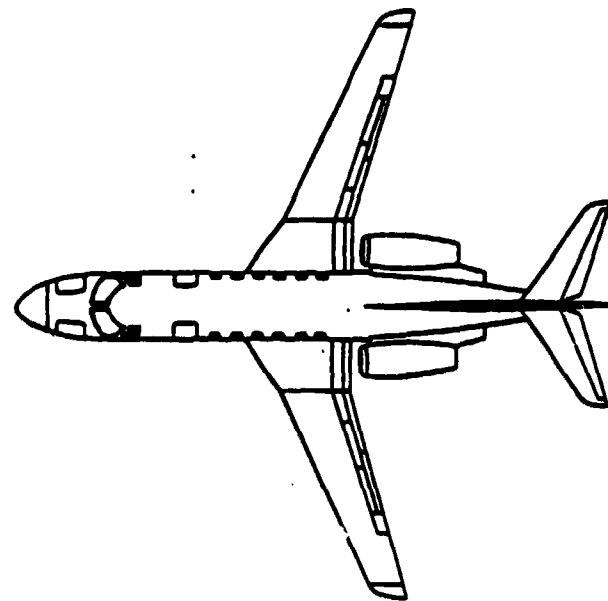
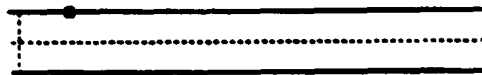
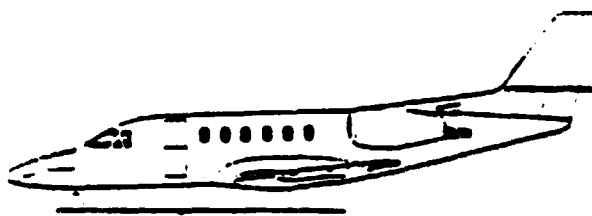


Figure II.82.3 Cassena Citation III. Roll plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
31. 33. 31. 33.  
0. 0. 0.  
SG  
1  
0. 50. 386  
0. 0. 0. 25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.83-1. Cessna Citation III. Data set for  
antenna location 2.



SEE  
FIGURE 11.83-1  
FOR  
ANTENNA PLACEMENT

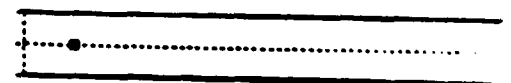


Figure II.83-2. Cessna Citation III. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

E-PHI  
DB PLOT

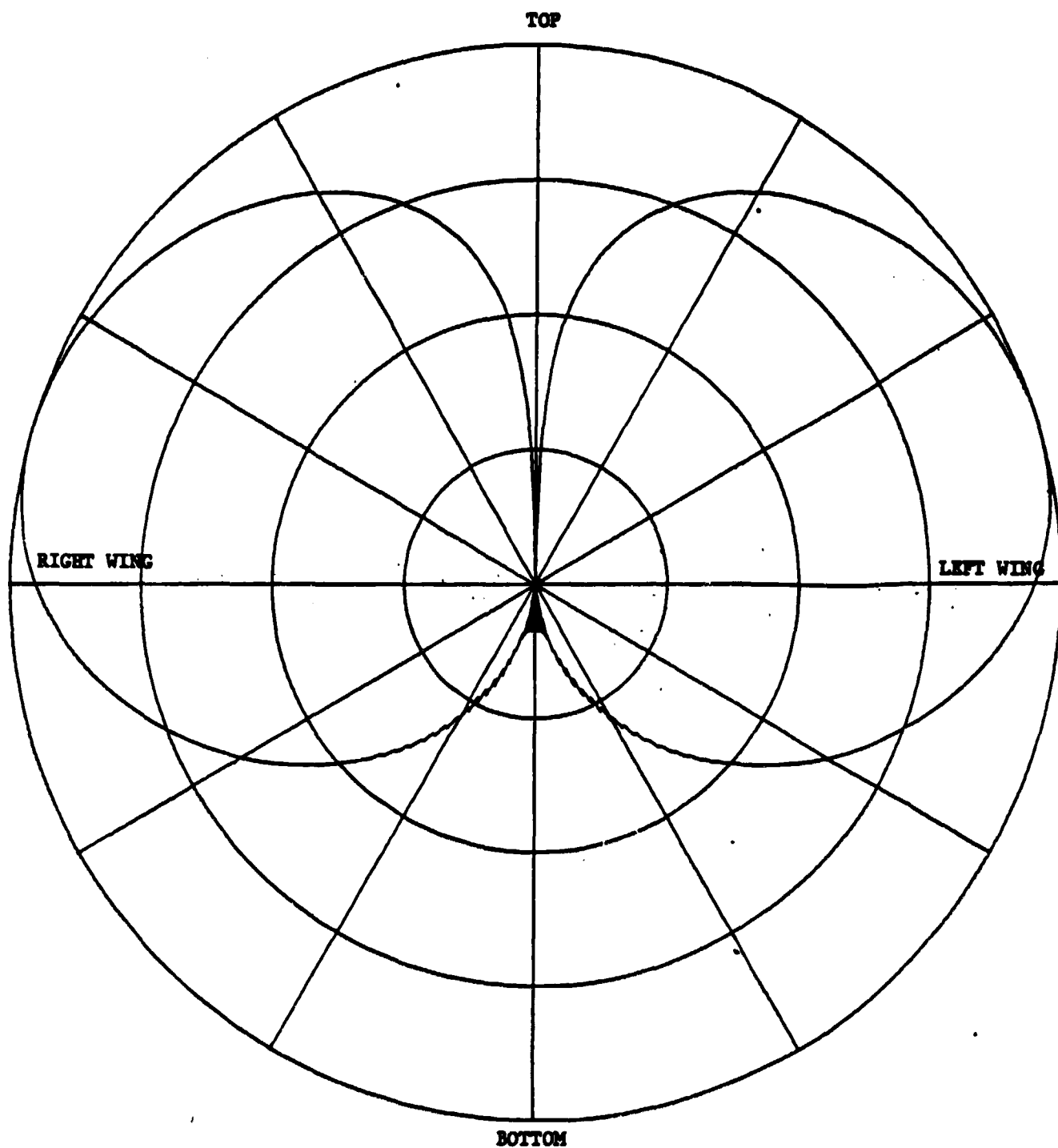


Figure II.83-3. Cessna Citation III. Roll plane pattern for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	16.5	29.	16.5	29.
	0.	0.	0.	
SG	1			
	0.	90.386		
	0.	0.	0.	25 3
	1.	0.		
PD	0.	0.	90.	
	0	360	1	
	90000.	9.2		
PP	3.75	3		
EX				

Figure II.84-1. Cassena Citation III. Data set for antenna location 3.

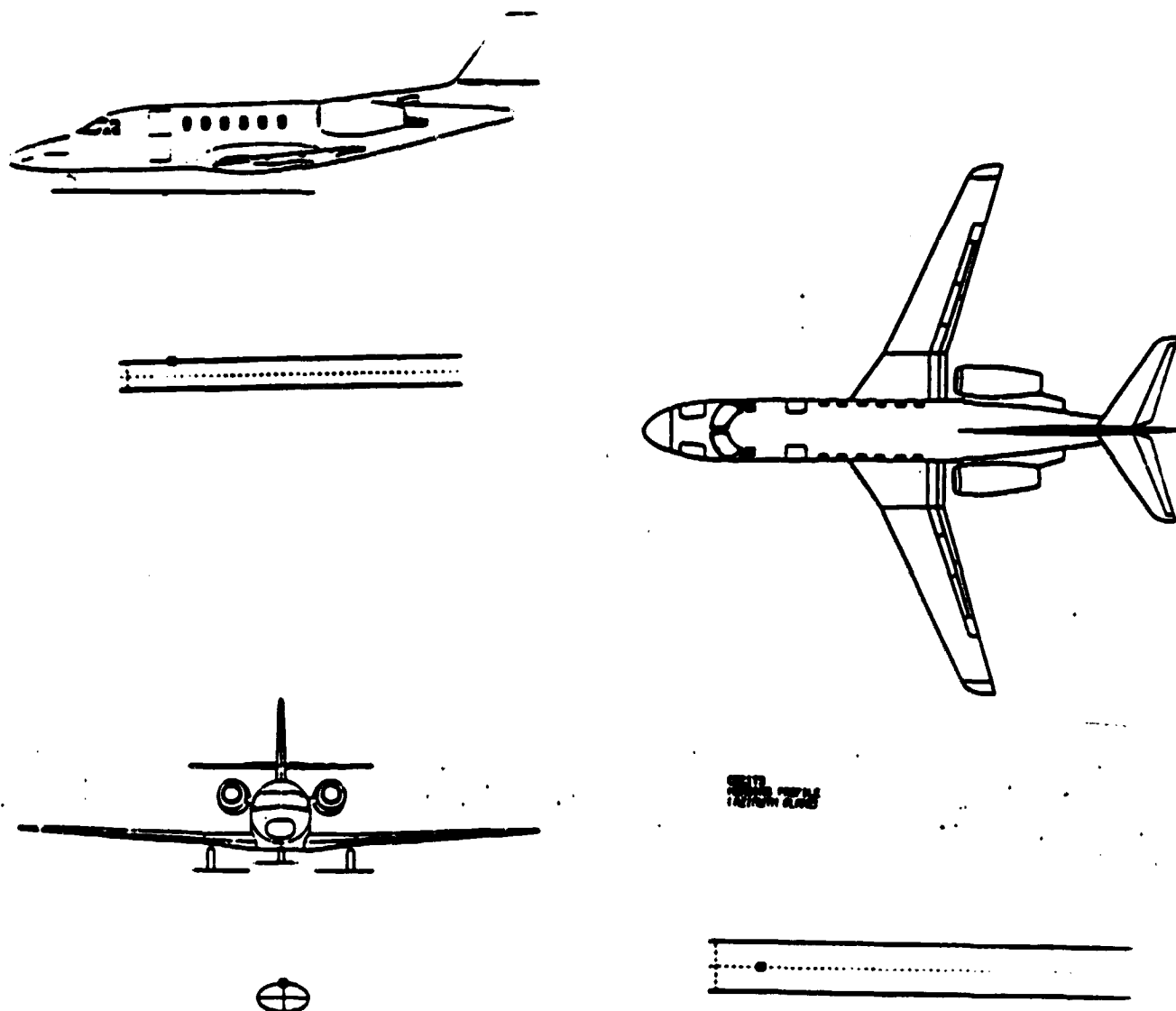


Figure II.84-2. Cessna Citation III. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 3.

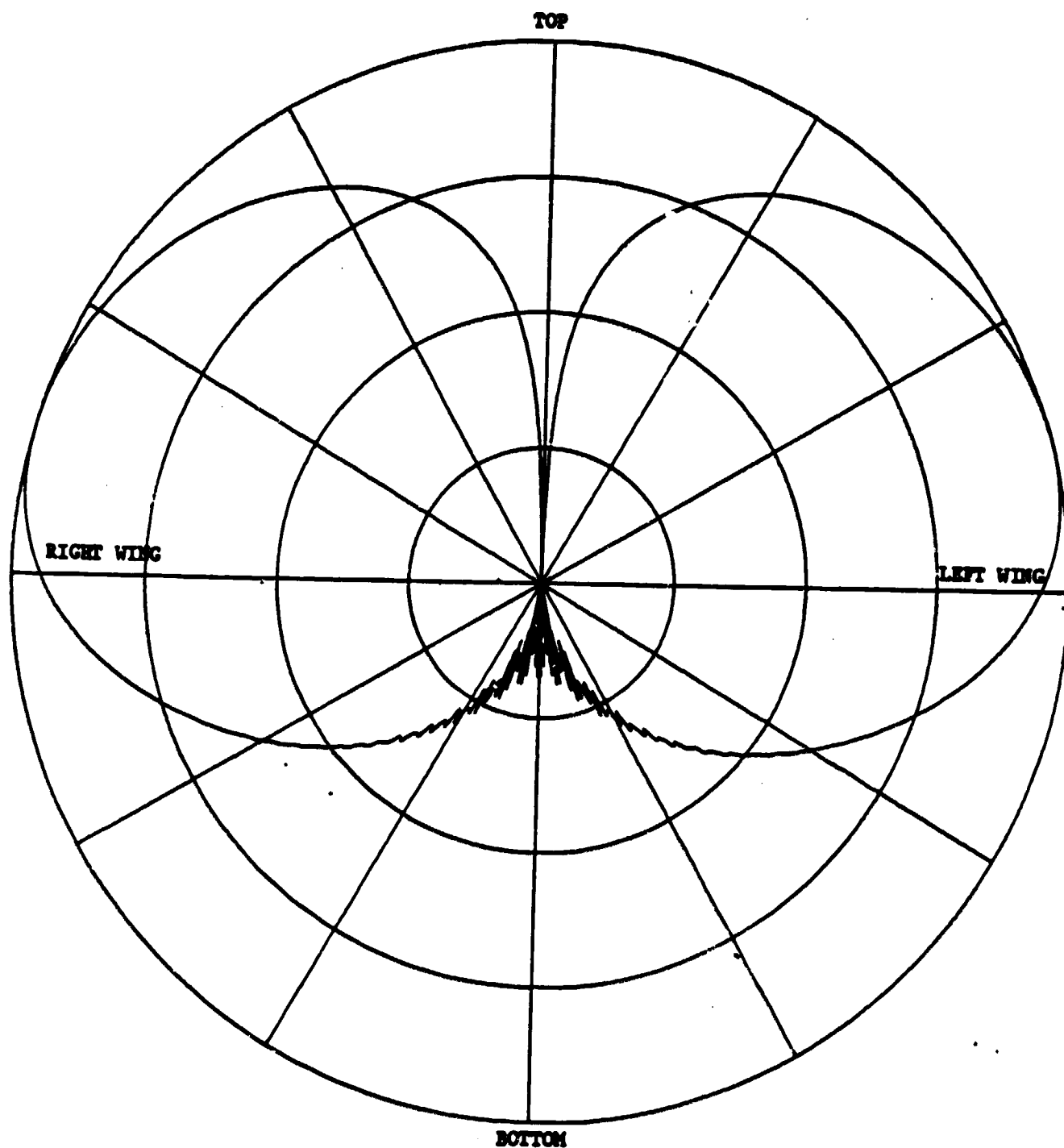


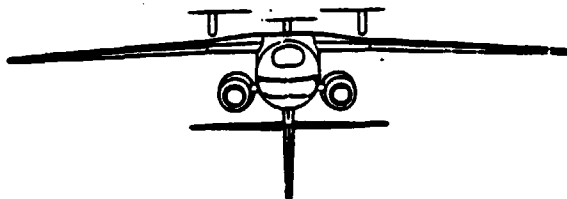
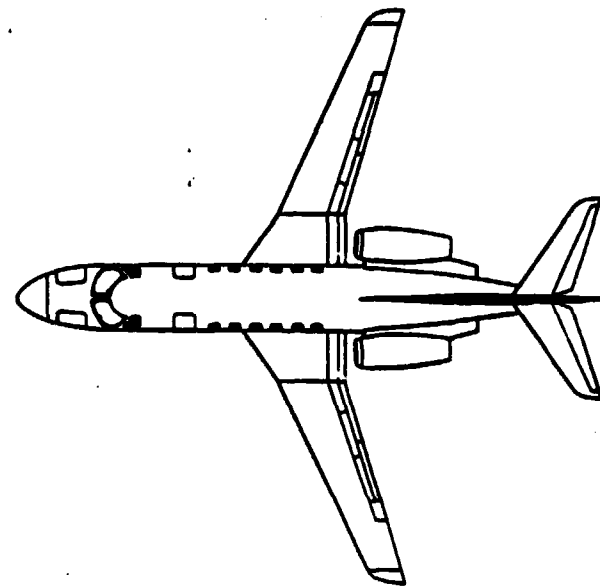
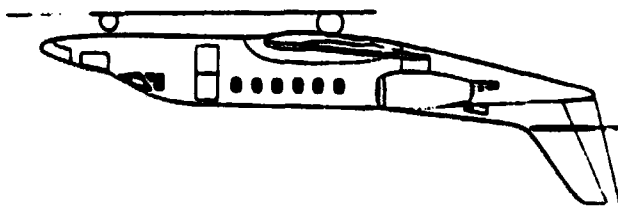
Figure II.84-3. Cessna Citation III. Roll plane pattern for location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG					
	12.	22.	12.	22.	
	0.	0.	0.		
SG					
	1				
	0.	50.	386		
	0.	0.	0.	25	3
	1.	0.			
PD					
	0.	0.	90.		
	0	360	1		
	50000.	5.2			
PP					
	3.75	3			
EX					

Figure II.85-1. Cassena Citation III. Data set for  
antenna location 4.





SEE  
FIGURE 11.85-1  
FOR ANTENNA PLACEMENT

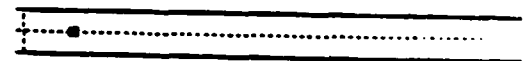


Figure II.85-2. Cessna Citation III. Bottom front 1/4 wavelength monopole antenna for antenna location 4.

E-PHI  
DB PLOT

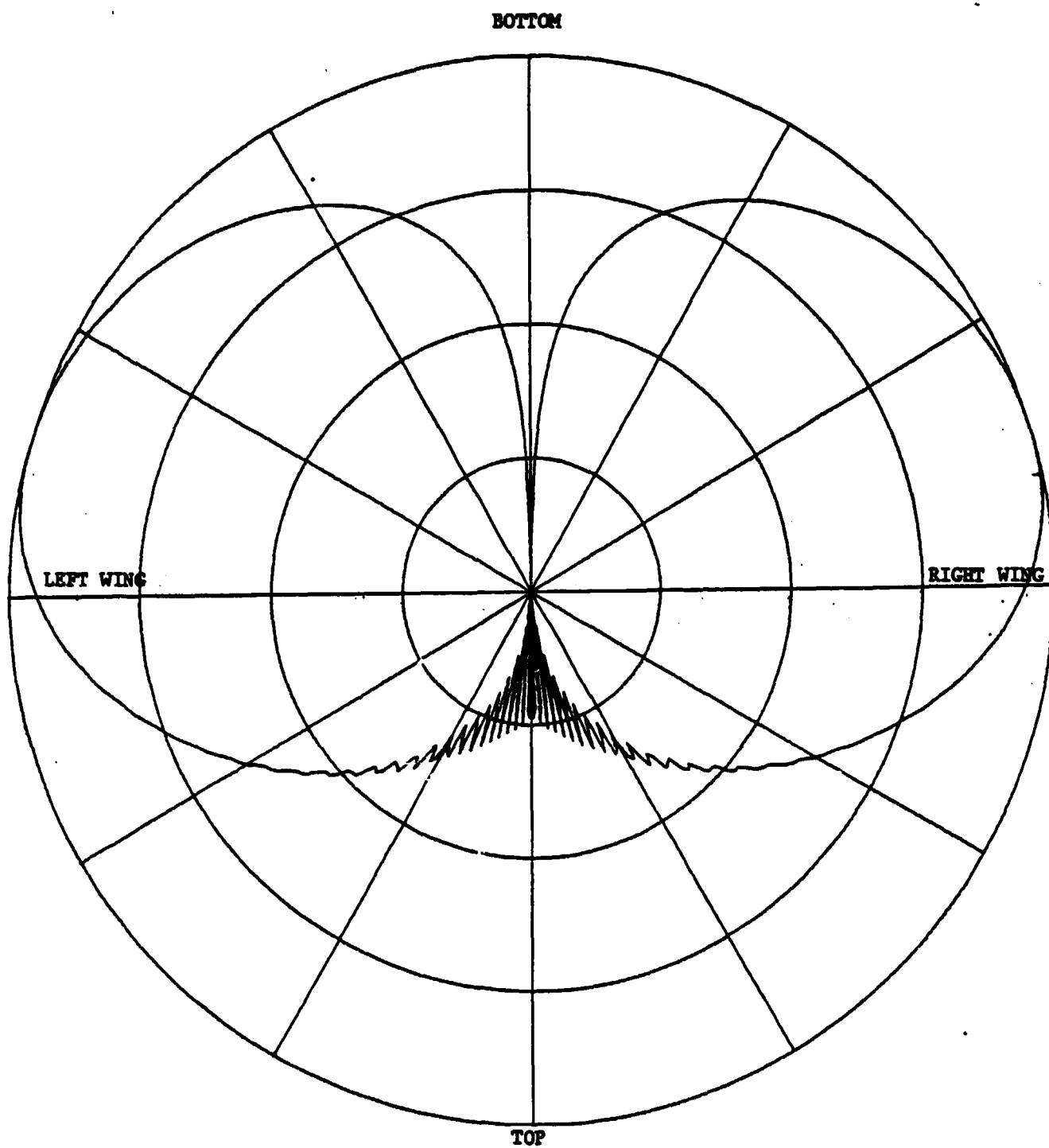


Figure II.85-3. Cessna Citation III. Roll plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
21. 20. 21. 20.
0. 0. 0.
PG
4 T
-2.562 17.934 29.89
-8.54 43.554 29.89
-6.348 34.16 62.342
-2.562 17.934 62.342
PG
4 T
-2.562 -17.934 62.342
-6.348 -34.16 62.342
-8.54 -43.554 29.89
-2.562 -17.934 29.89
SG
1
0. 50.386
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3.
EX

```

Figure II.86-1. Cassina Citation III. Data set for  
antenna location 5.

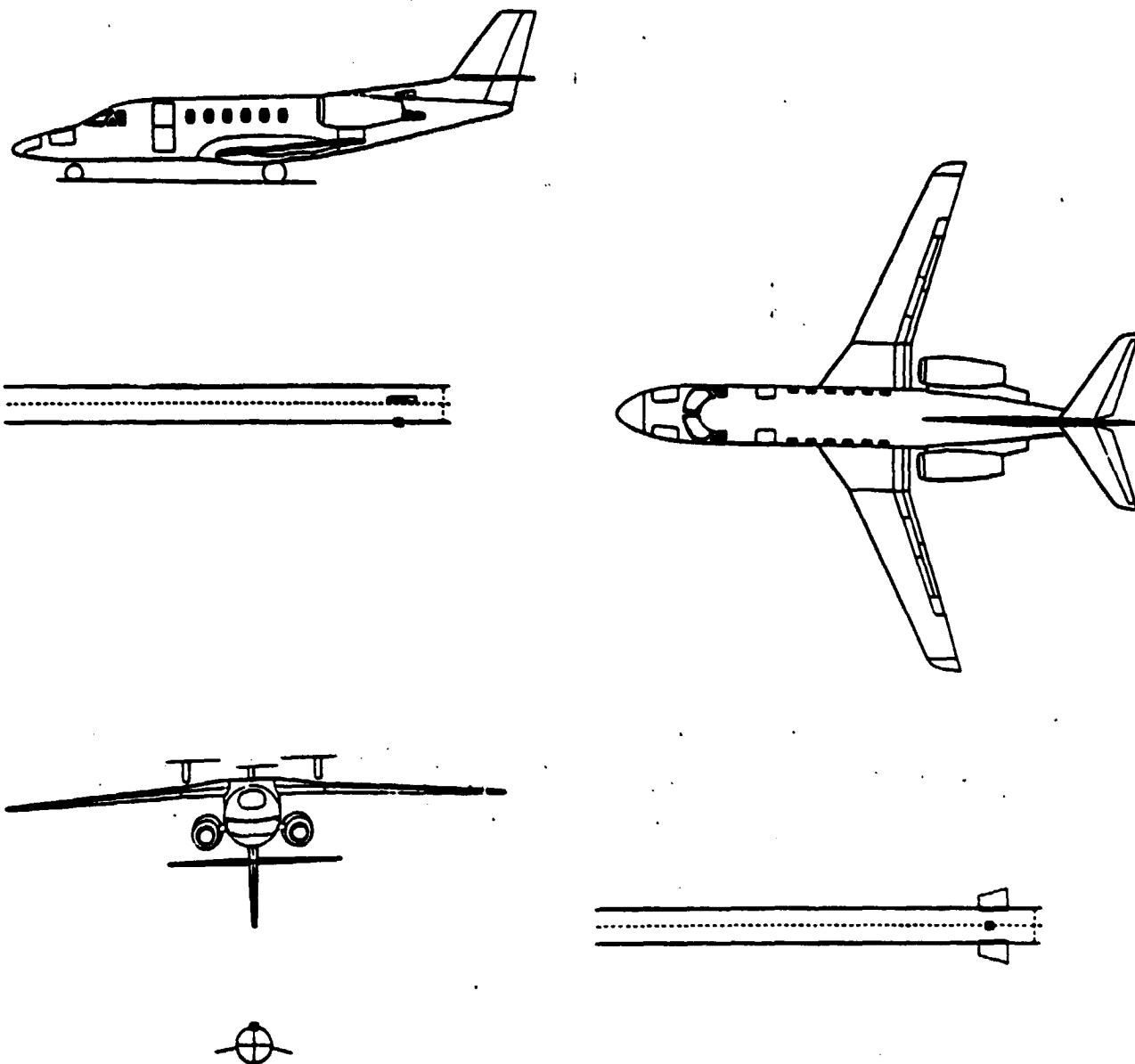


Figure II.86-2. Cessna Citation III. Bottom rear 1/4 wavelength monopole antenna for antenna location 5.

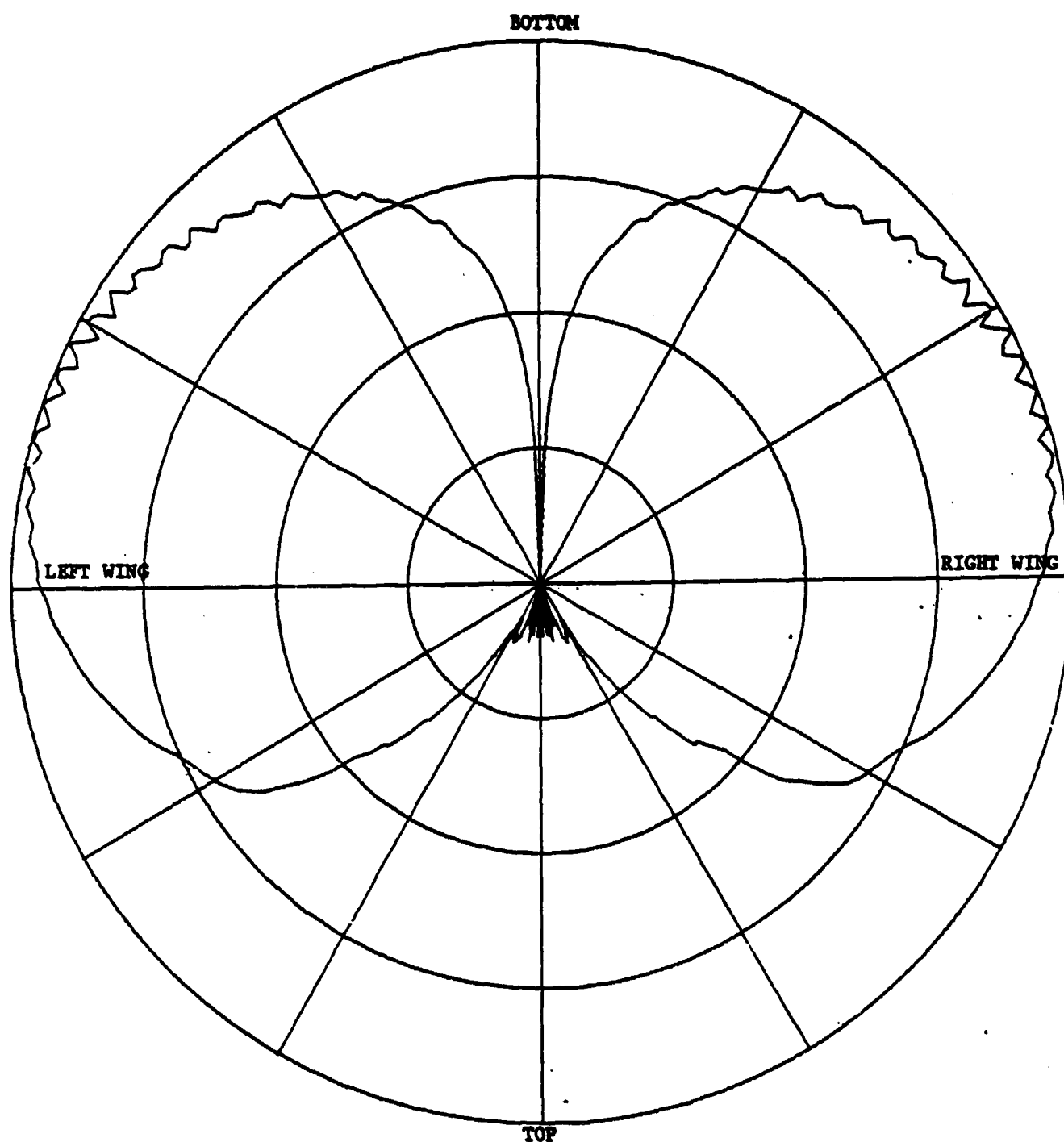


Figure II.86-3. Cessna Citation III. Roll plane pattern for antenna location 5.

#### II.10. Piper PA-31P Pressurized Navajo

Roll plane patterns are calculated for five particular antenna locations of this aircraft.

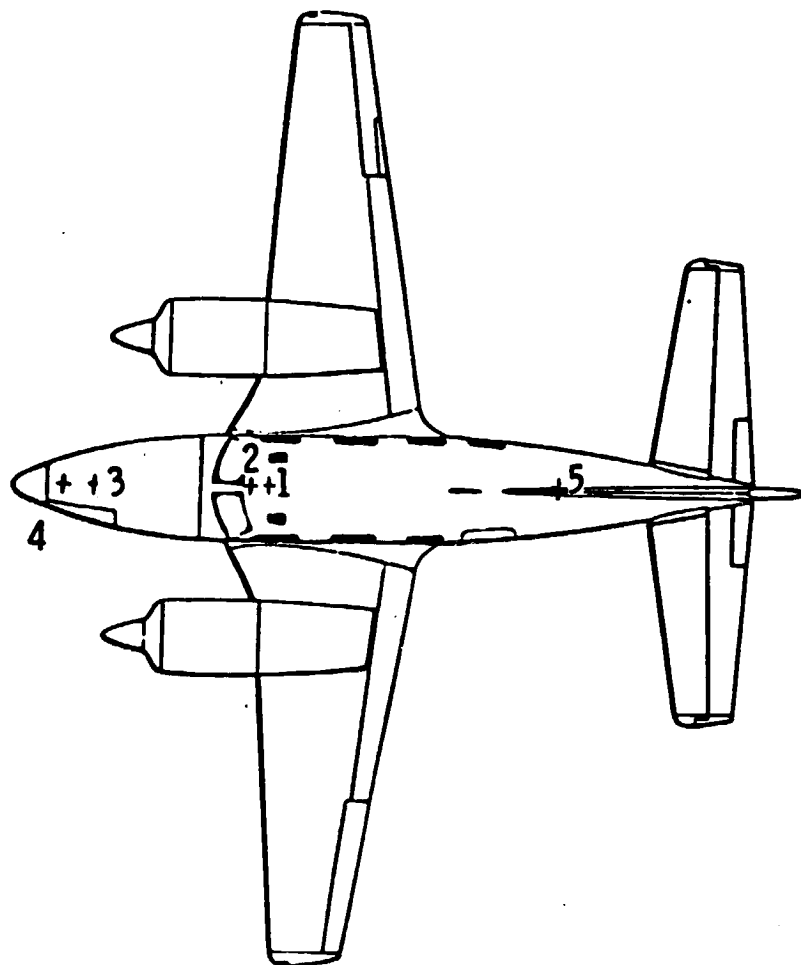
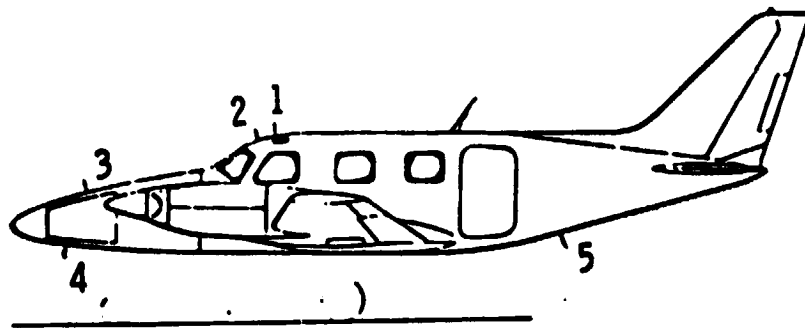


Figure II.87. Piper PA-31P Pressurized Navajo. Antenna locations.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG  
21.09 27.18 41.49 27.18  
0. 0. 0.  
PG  
4 T  
-23.4 21. 10.8  
-21. 54. 25.8  
-21. 54. 102.6  
-23.4 21. 108.  
PG  
5 F  
-21. 54. 25.8  
-21. 54. -17.4  
-7.8 54. -17.4  
-7.8 54. 102.6  
-21. 54. 102.6  
PG  
4 F  
-7.8 54. -17.4  
-5.4 89.4 -17.4  
-5.4 89.4 96.  
-7.8 54. 102.6  
PG  
5 F  
-19.2 89.4 96.  
-5.4 89.4 96.  
-5.4 89.4 -17.4  
-19.2 89.4 -17.4  
-19.2 89.4 28.8  
PG  
4 F  
-19.2 89.4 28.8  
-10.8 222. 38.4  
-10.8 222. 72.  
-19.2 89.4 96.  
PG  
4 T  
-23.4 -21. 108.  
-21. -54. 102.6  
-21. -54. 25.8  
-23.4 -21. 10.8  
PG  
5 F  
-21. -54. 102.6  
-7.8 -54. 102.6  
-7.8 -54. -17.4  
-21. -54. -17.4  
-21. -54. 25.8  
PG

4 F  
-7.8 -54. 102.6  
-5.4 -89.4 96.  
-5.4 -89.4 -17.4  
-7.8 -54. -17.4  
PG  
5 F  
-19.2 -89.4 28.8  
-19.2 -89.4 -17.4  
-5.4 -89.4 -17.4  
-5.4 -89.4 96.  
-19.2 -89.4 96.  
PG  
4 F  
-19.2 -89.4 96.  
-10.8 -222. 72.  
-10.8 -222. 38.4  
-19.2 -89.4 28.8  
SG  
1  
0. 32.4  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.88-1. Piper PA-31P Pressurized Navajo. Data set for antenna location 1.



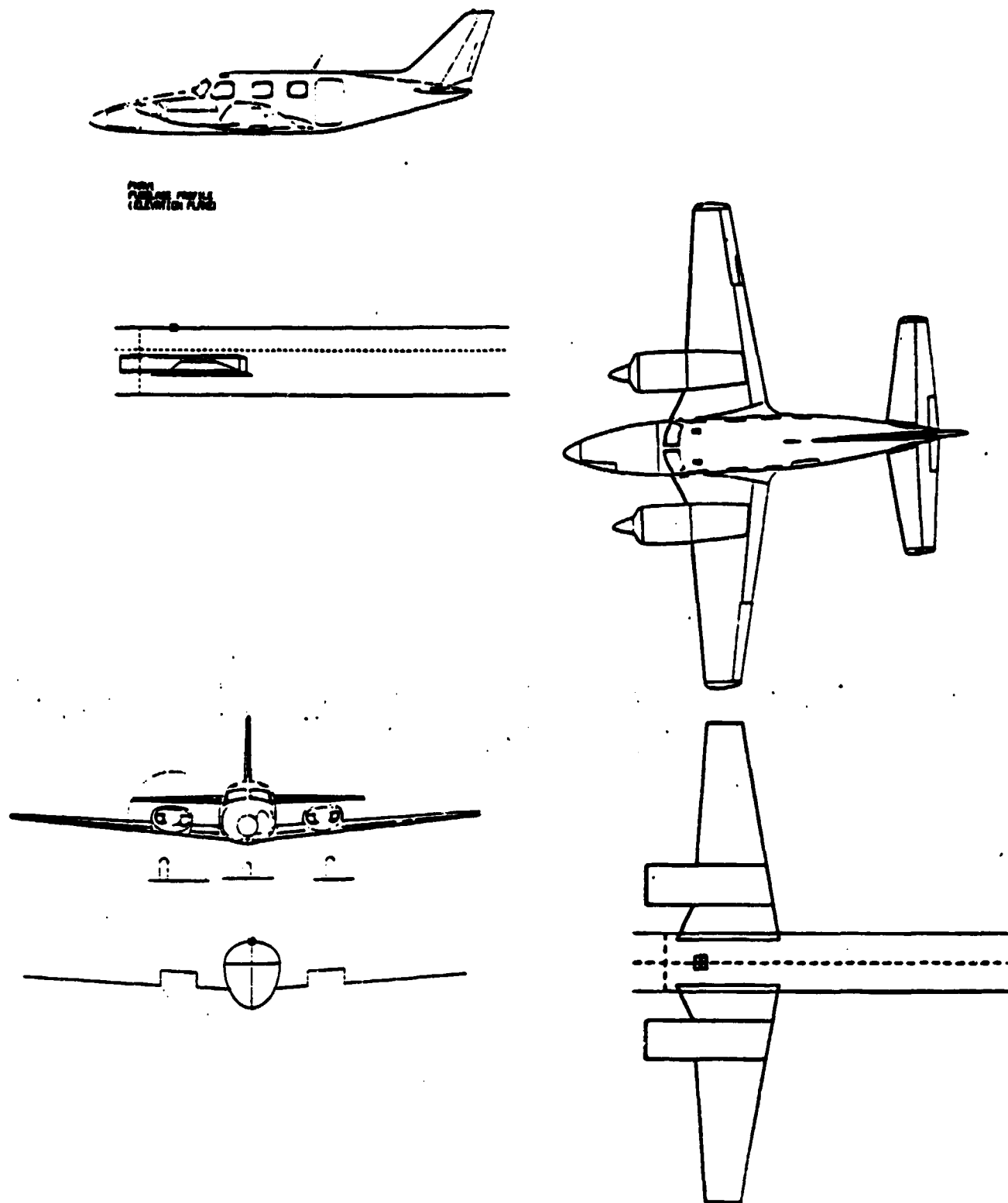


Figure II.88-2. Piper PA-31P Pressurized Navajo. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 1.

E-PHI  
DB PLOT

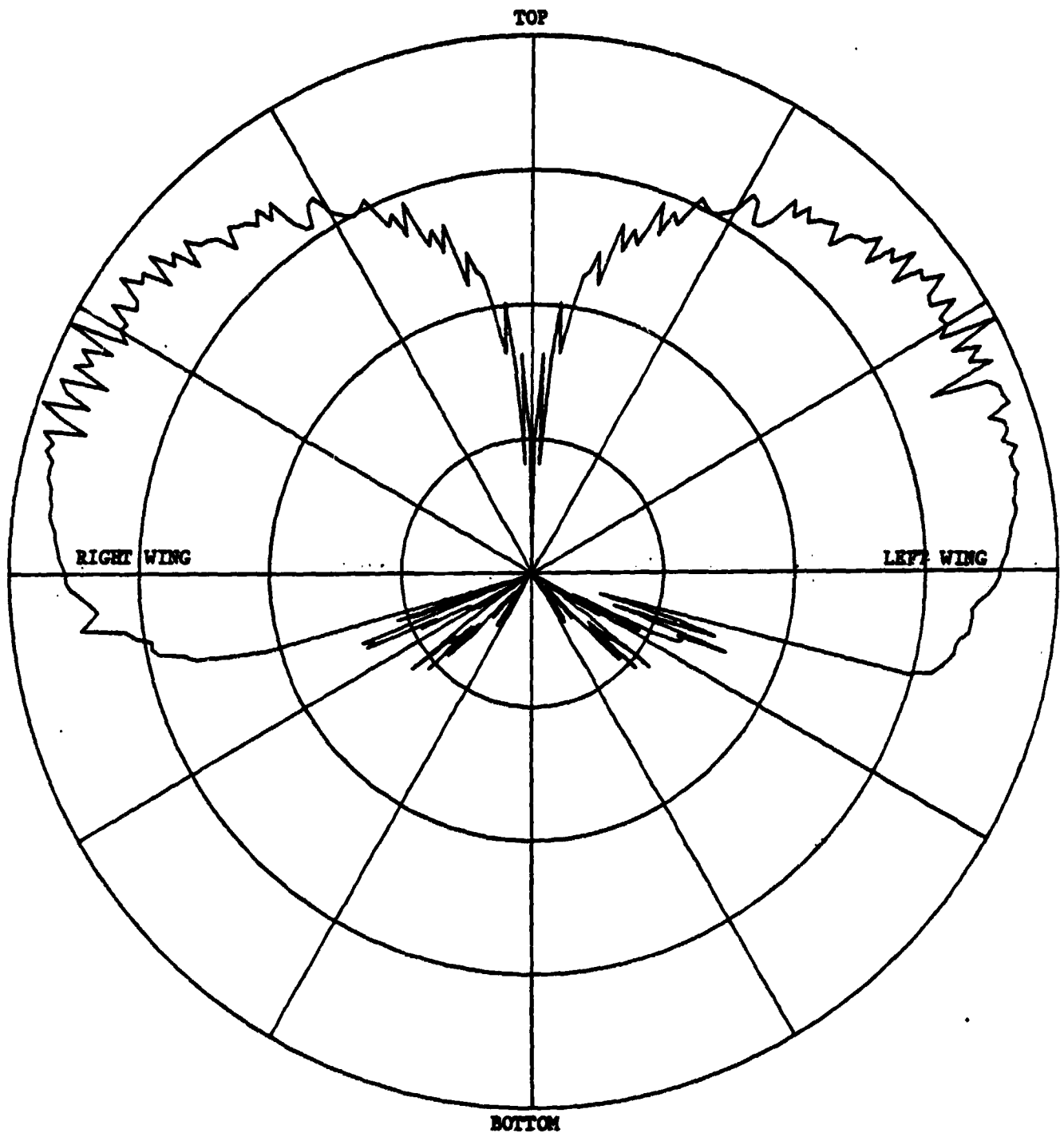


Figure II.88-3. Piper PA-31P Pressurized Navajo. Roll plane pattern for antenna location 1.

FC  
19.09 27.18 36.49 27.18  
0. 0. 0.  
PG  
4 T  
-23.4 21. 10.8  
-21. 54. 25.8  
-21. 54. 102.6  
-23.4 21. 108.  
PG  
5 F  
-21. 54. 25.8  
-21. 54. -17.4  
-7.8 54. -17.4  
-7.8 54. 102.6  
-21. 54. 102.6  
PG  
4 F  
-7.8 54. -17.4  
-5.4 89.4 -17.4  
-5.4 89.4 96.  
-7.8 54. 102.6  
PG  
5 F  
-19.2 89.4 96.  
-5.4 89.4 96.  
-5.4 89.4 -17.4  
-19.2 89.4 -17.4  
-19.2 89.4 28.8  
PG  
4 F  
-19.2 89.4 28.8  
-10.8 222. 38.4  
-10.8 222. 72.  
-19.2 89.4 96.  
PG  
4 T  
-23.4 -21. 108.  
-21. -54. 102.6  
-21. -54. 25.8  
-23.4 -21. 10.8  
PG  
5 F  
-21. -54. 102.6  
-7.8 -54. 102.6  
-7.8 -54. -17.4  
-21. -54. -17.4  
-21. -54. 25.8  
PG

4 F  
-7.8 -54. 102.6  
-5.4 -89.4 96.  
-5.4 -89.4 -17.4  
-7.8 -54. -17.4  
PG  
5 F  
-19.2 -89.4 28.8  
-19.2 -89.4 -17.4  
-5.4 -89.4 -17.4  
-5.4 -89.4 96.  
-19.2 -89.4 96.  
PG  
4 F  
-19.2 -89.4 96.  
-10.8 -222. 72.  
-10.8 -222. 38.4  
-19.2 -89.4 28.8  
SG  
1  
0. 25.2  
0. 0. 0. .25 3  
1. 0.  
PD  
0. 0. 90.  
0 360 1  
50000. 5.2  
PP  
3.75 3  
EX

Figure II.89-1. Piper PA-31P Pressurized Navajo. Data set for antenna location 2.

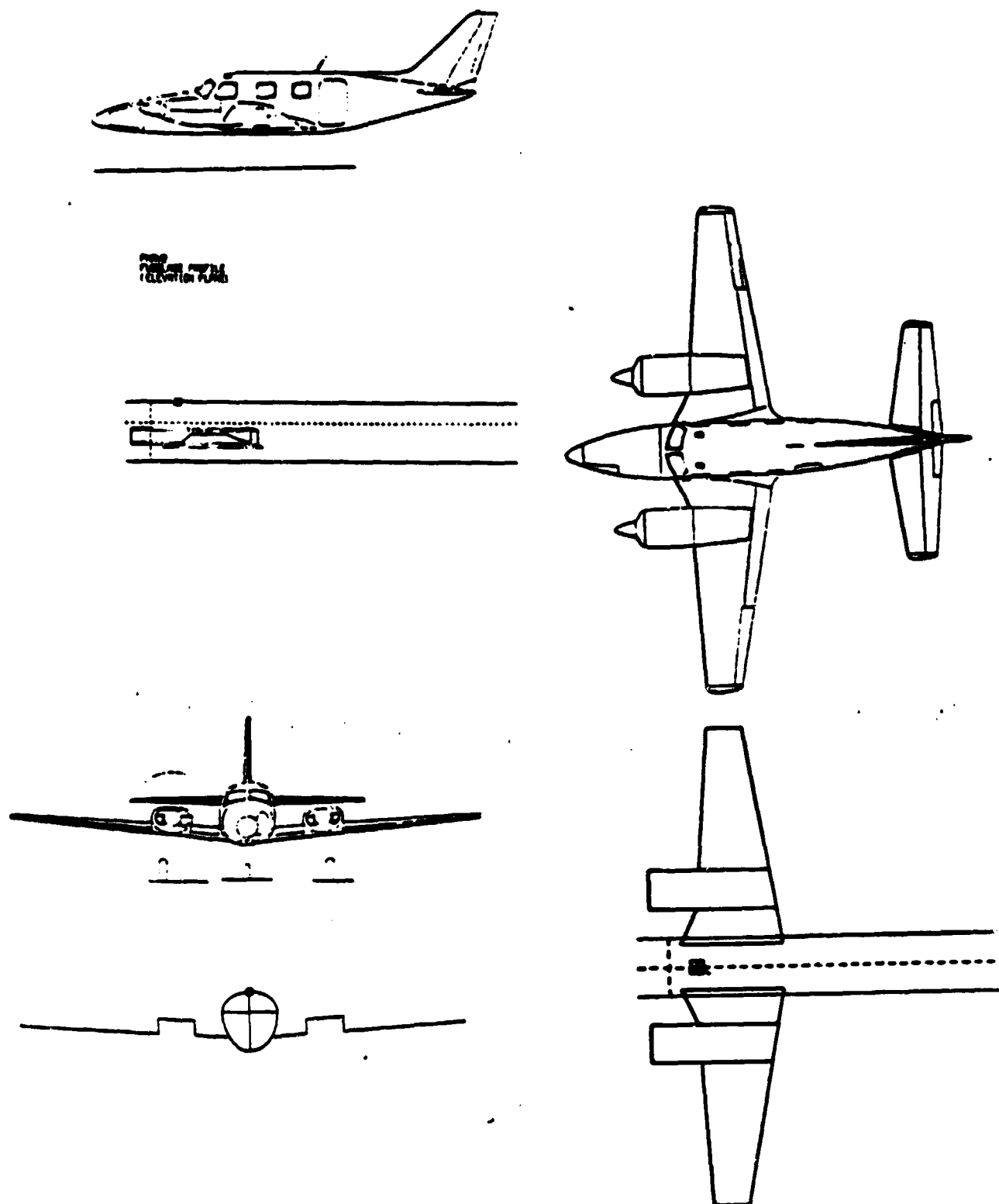


Figure II.89-2. Piper PA-31P Pressurized Navajo. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

E-PHI  
DB PLOT

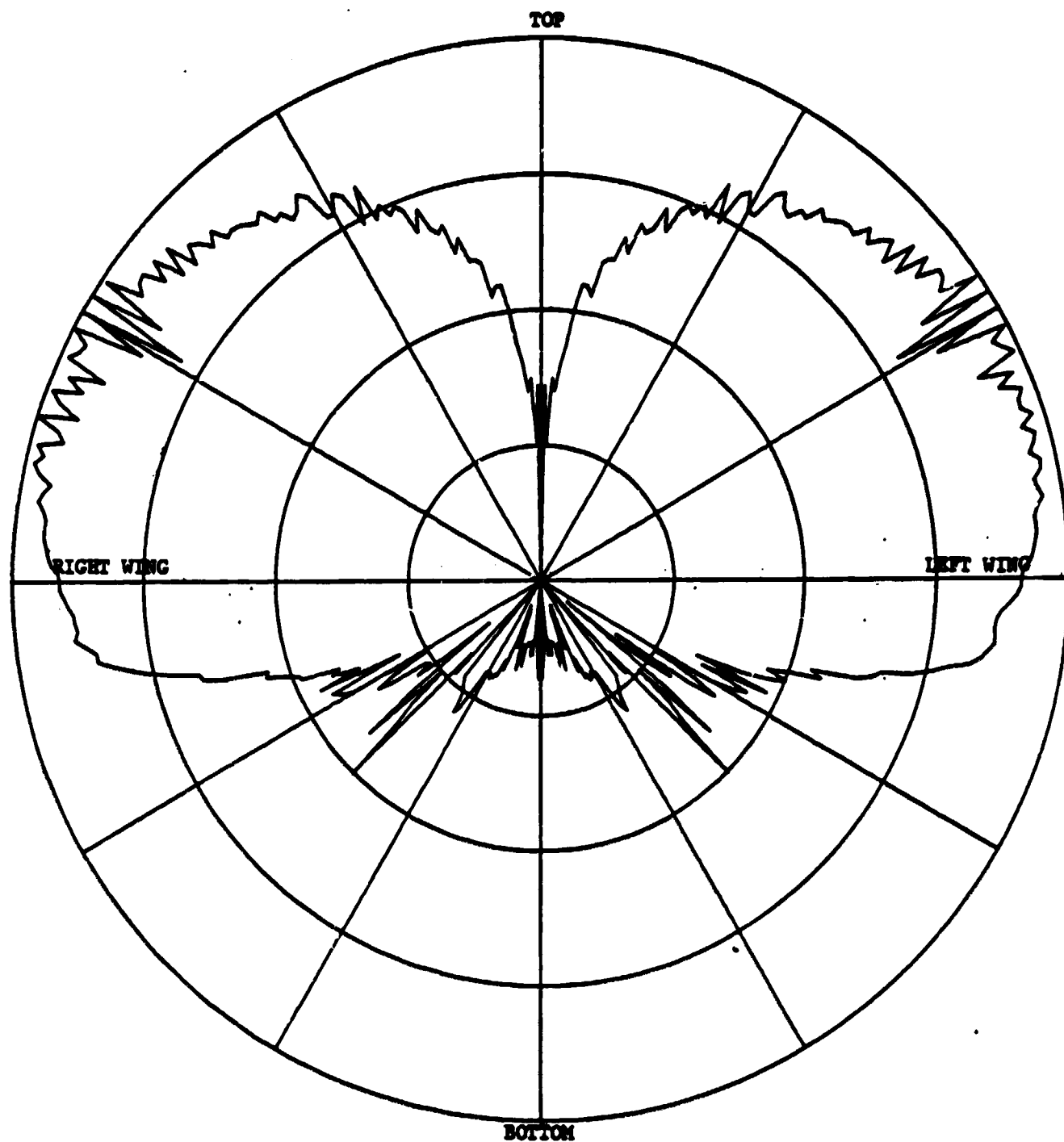


Figure II.89-3. Piper PA-31P Pressurized Navajo. Roll plane pattern for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	13.5	17.0	13.5	17.0
	0.	0.	0.	
SG				
1	0.	32.4		
	0.	0.	0.	.25 3
	1.	0.		
PD	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP	3.75	3		
EX				

Figure II.90-1. Piper PA-31P Pressurized Navajo. Data set for antenna location 3.

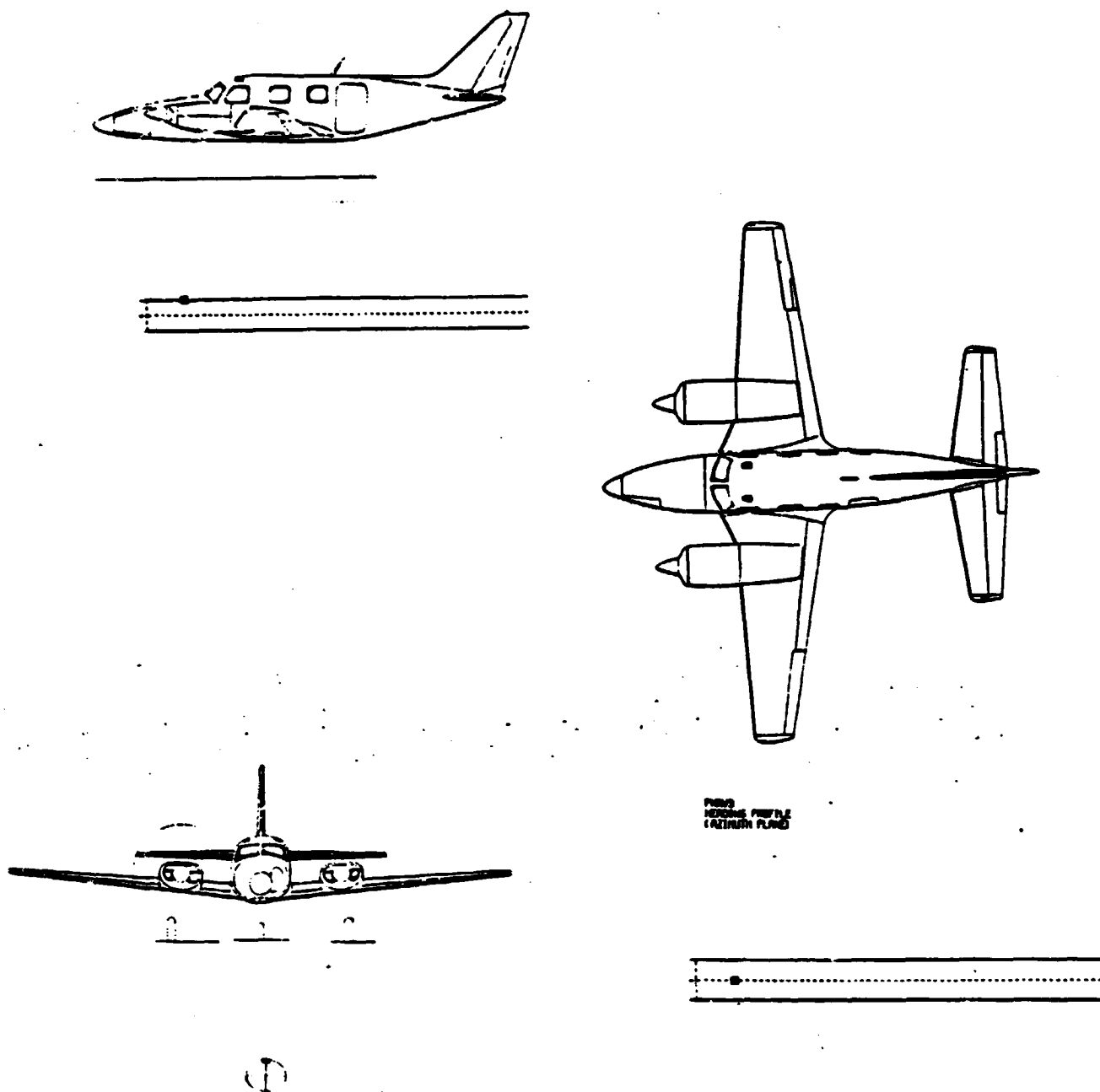


Figure II.90-2. Piper PA-31P Pressurized Navajo. Top front 1/4 wavelength monopole antenna forward of cockpit for antenna location 3.

E-PHI  
UB PLOT

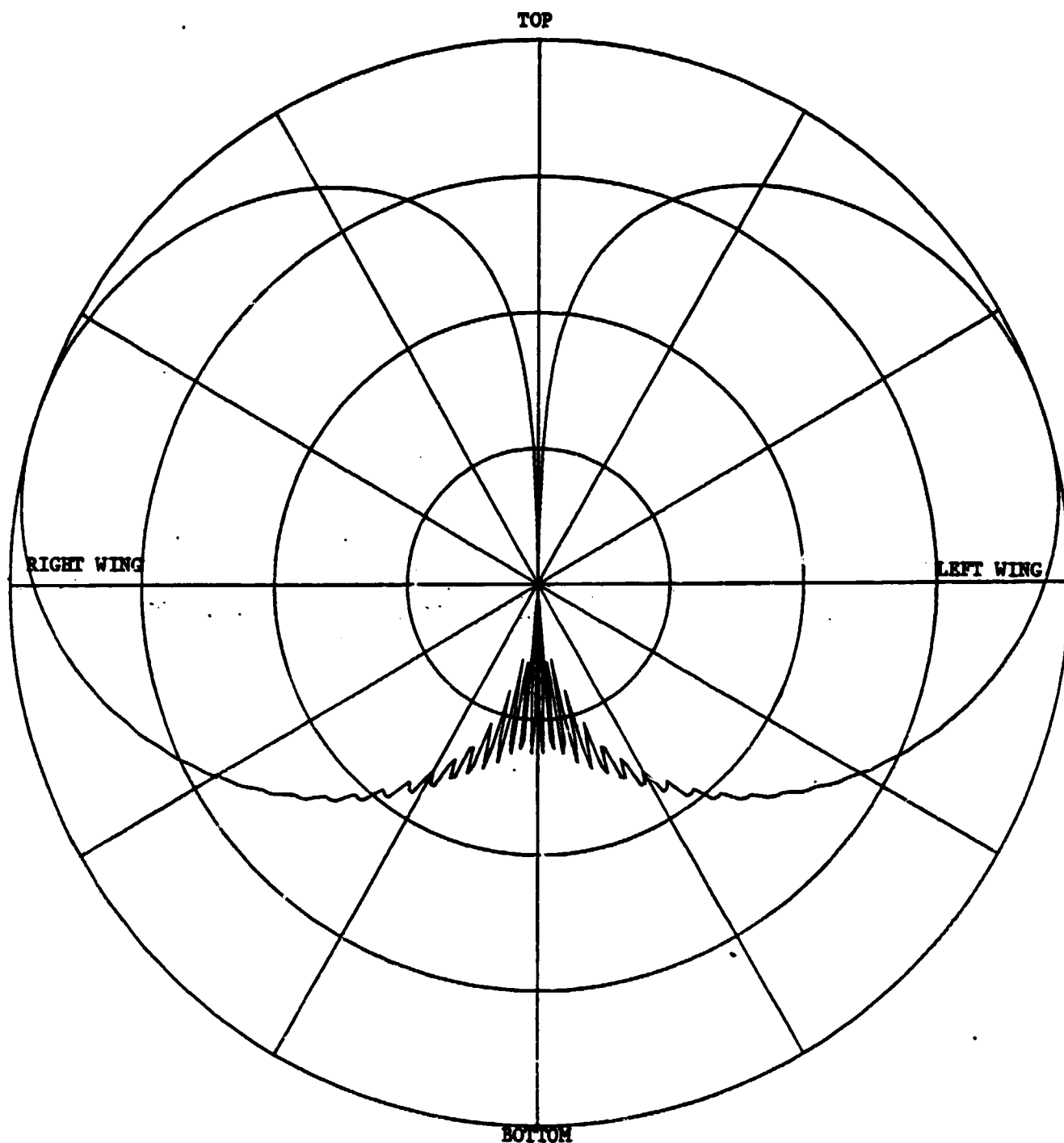


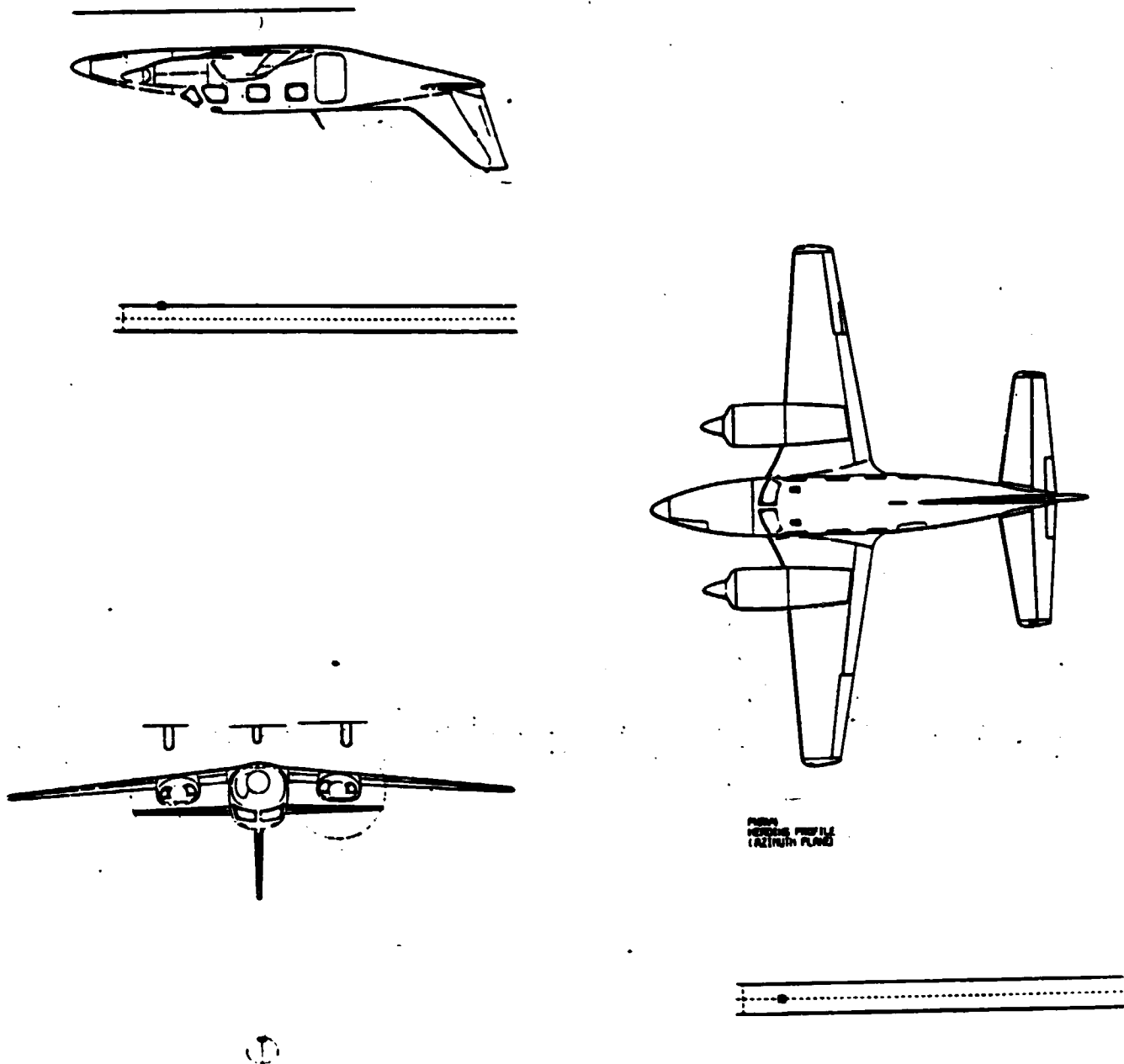
Figure II.90-3. Piper PA-31P Pressurized Navajo. Roll plane pattern for antenna location 3.



ORIGINAL PAGE IS  
OF POOR QUALITY

FG				
	11.0	13.0	11.0	13.0
	0.	0.	0.	
SG				
	1			
	0.	32.4		
	0.	0.	0.	.25 3
	1.	0.		
PD				
	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP				
	3.75	3		
FX				

Figure II.91-1. Piper PA-31P Pressurized Navajo. Data set for antenna location 4.



FROM  
REAR VIEW  
(AZIMUTH PLANE)

Figure II.91-2. Piper PA-31P Pressurized Navajo. Bottom front  $1/4$  wavelength monopole antenna for antenna location 4.

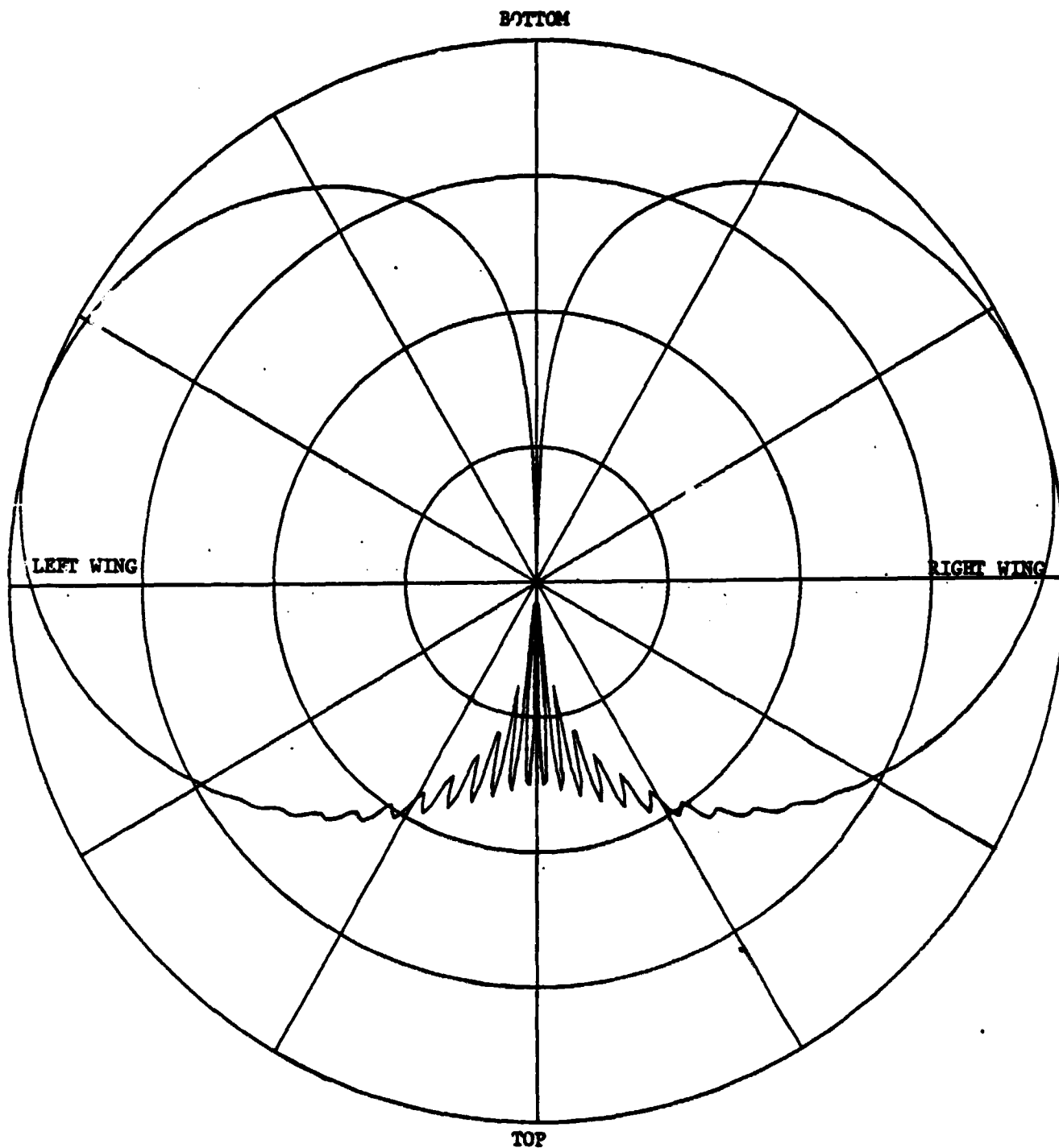


Figure II.91-3. Piper PA-31P Pressurized Navajo. Roll plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	21.0	20.0	21.0	20.0
	0.	0.	0.	
SG				
1				
	0.	32.4		
	0.	0.	0.	.25 3
	1.	0.		
PD				
	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP				
	3.75	3		
EX				

Figure II.92-1. Piper PA-31P Pressurized Navajo. Data set for antenna location 5.

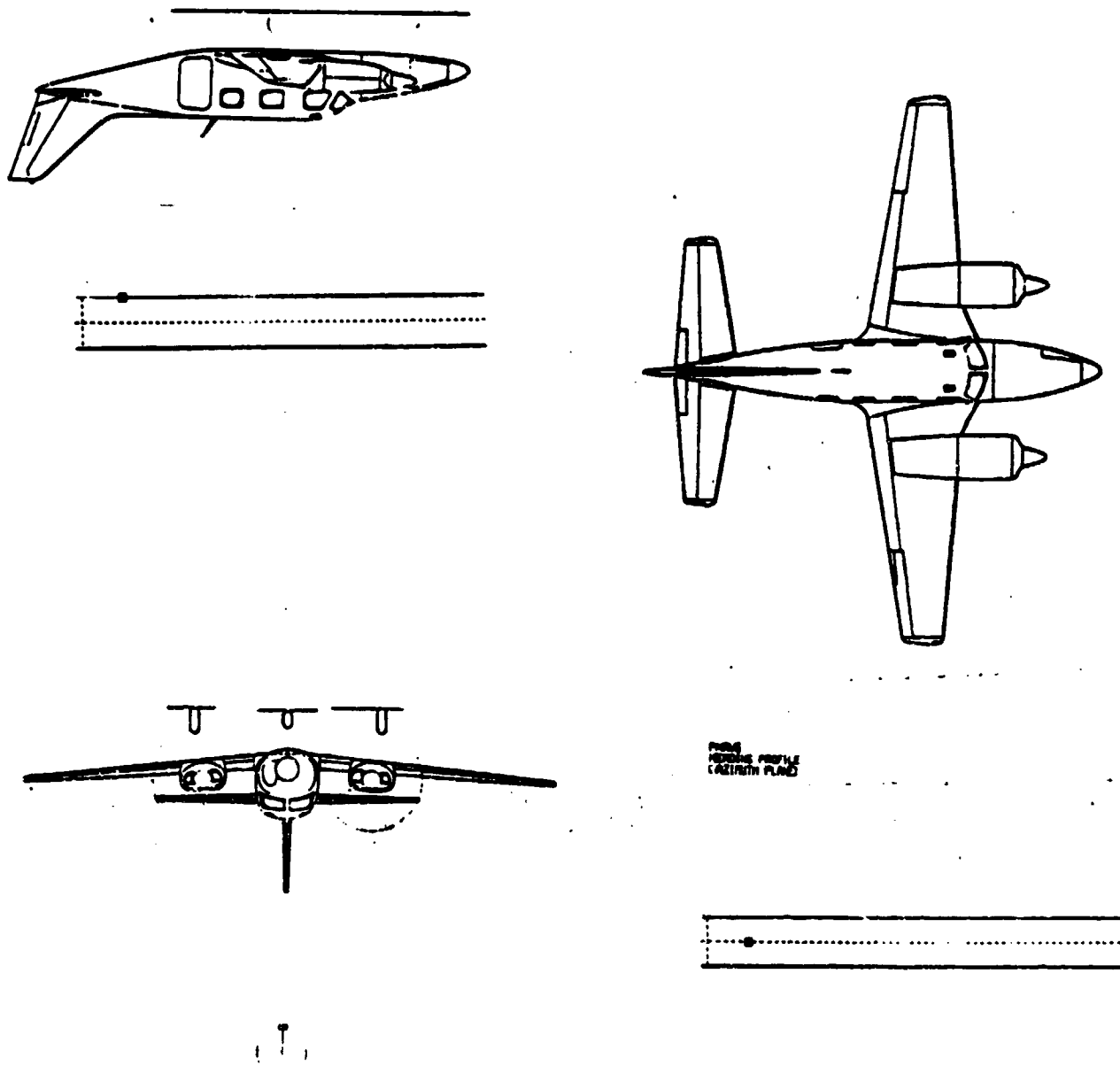


Figure II.92-2. Piper PA-31<sup>2</sup> Pressurized Navajo. Bottom rear 1/4 wavelength monopole antenna for antenna location 5.

E-PHI  
DB PLOT

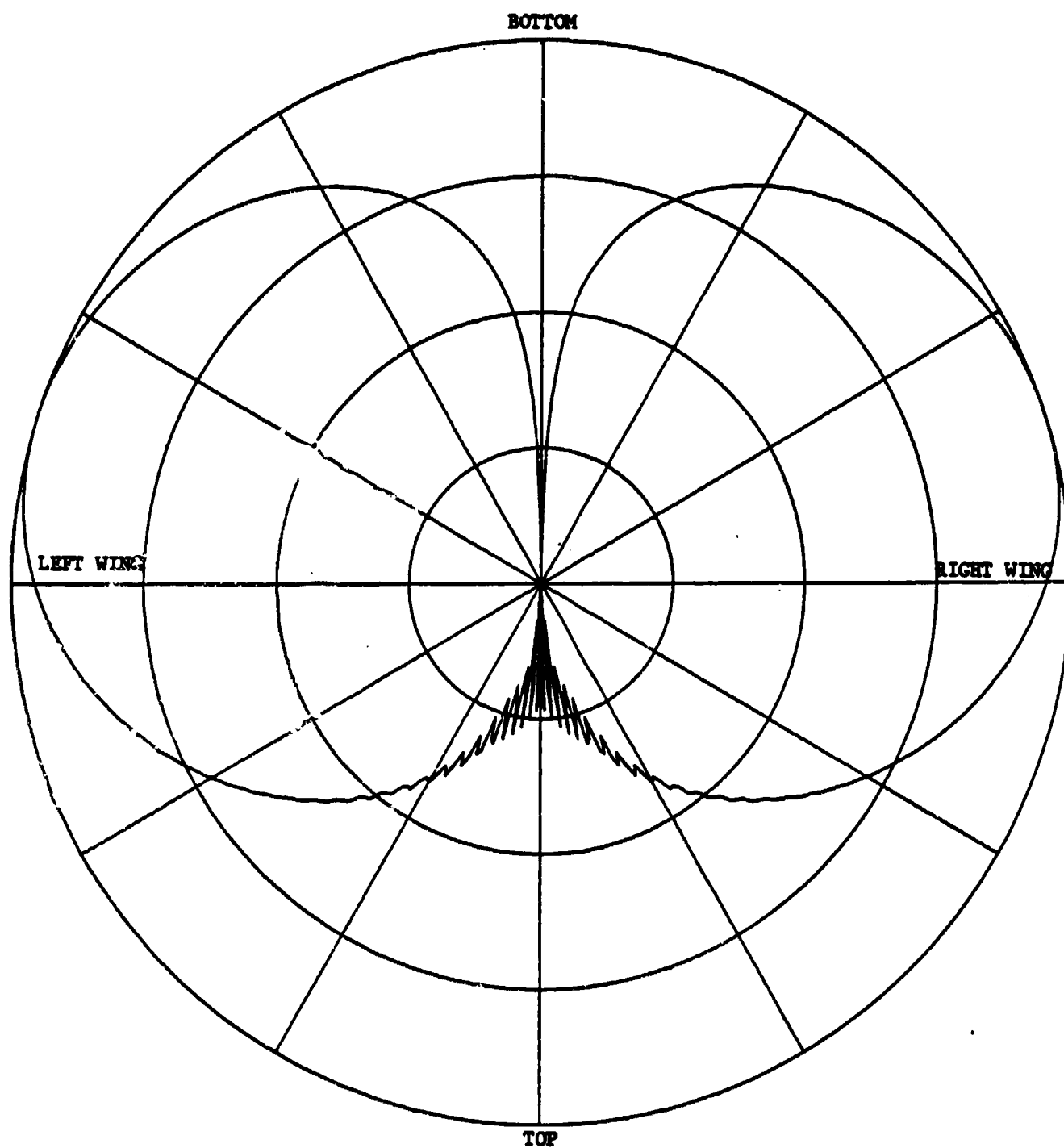


Figure II.92-3. Piper PA-31P Pressurized Navajo. Roll plane pattern for antenna location 5.

#### II.11. Lear Jet

Roll plane patterns are calculated for four particular antenna locations of this aircraft. Several modeling attempts are made for an antenna location.

ORIGINAL PAGE IS  
OF POOR QUALITY

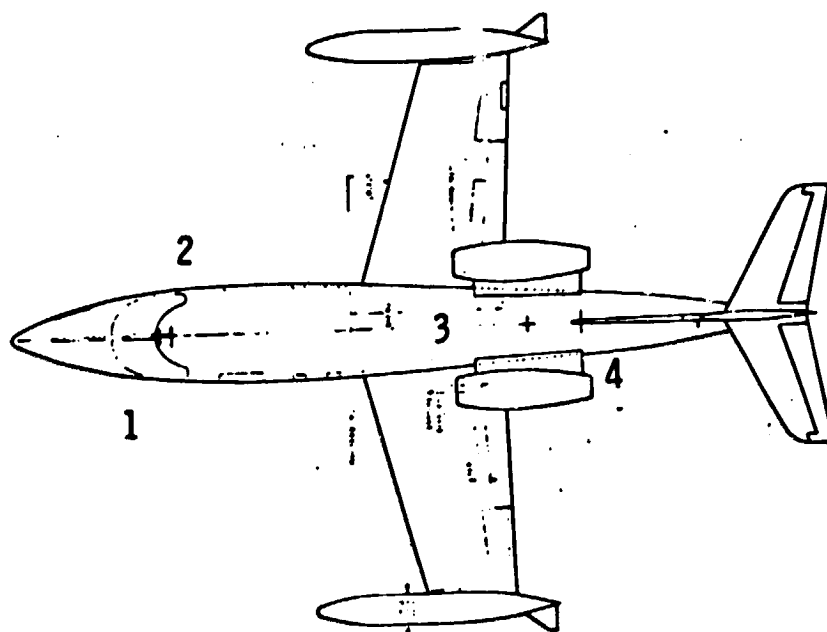
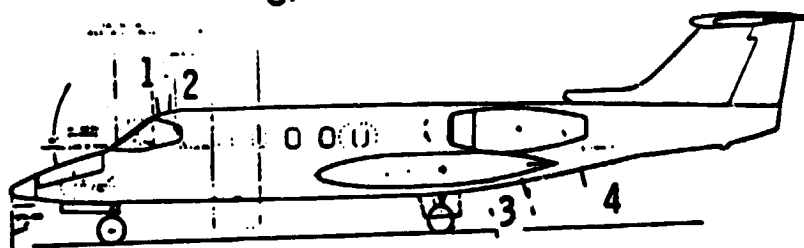


Figure II.93. Lear Jet. Antenna locations.

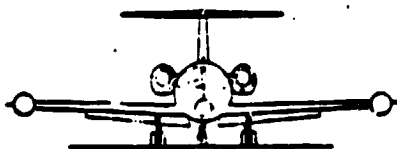
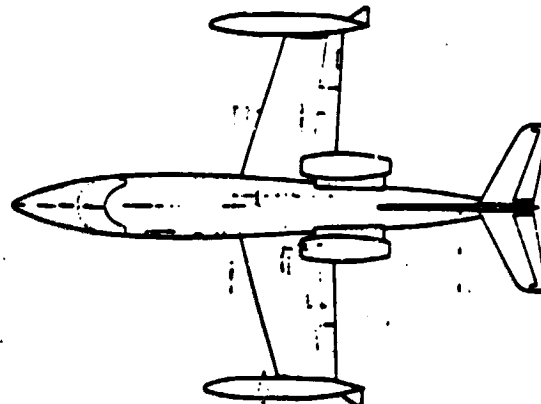
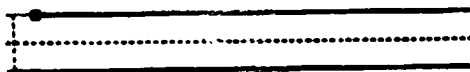
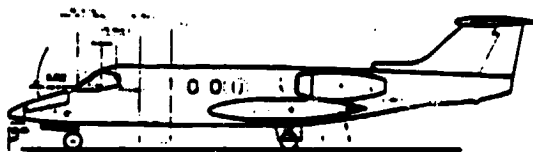


ORIGINAL PAGE IS  
OF POOR QUALITY

FG	30.	30.	30.	30.
	0.	0.	0.	
SG				
	1			
	0.	22.45		
	0.	0.	0.	.25 3
	1.	0.		
PN				
	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP				
	3.75	3		
EX				

Figure II.94-1. Lear Jet. Data set for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY



ALL  
DIMENSIONS IN INCHES

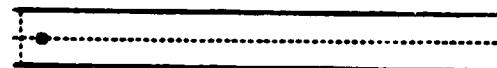


Figure II.94-2. Lear Jet. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 1.

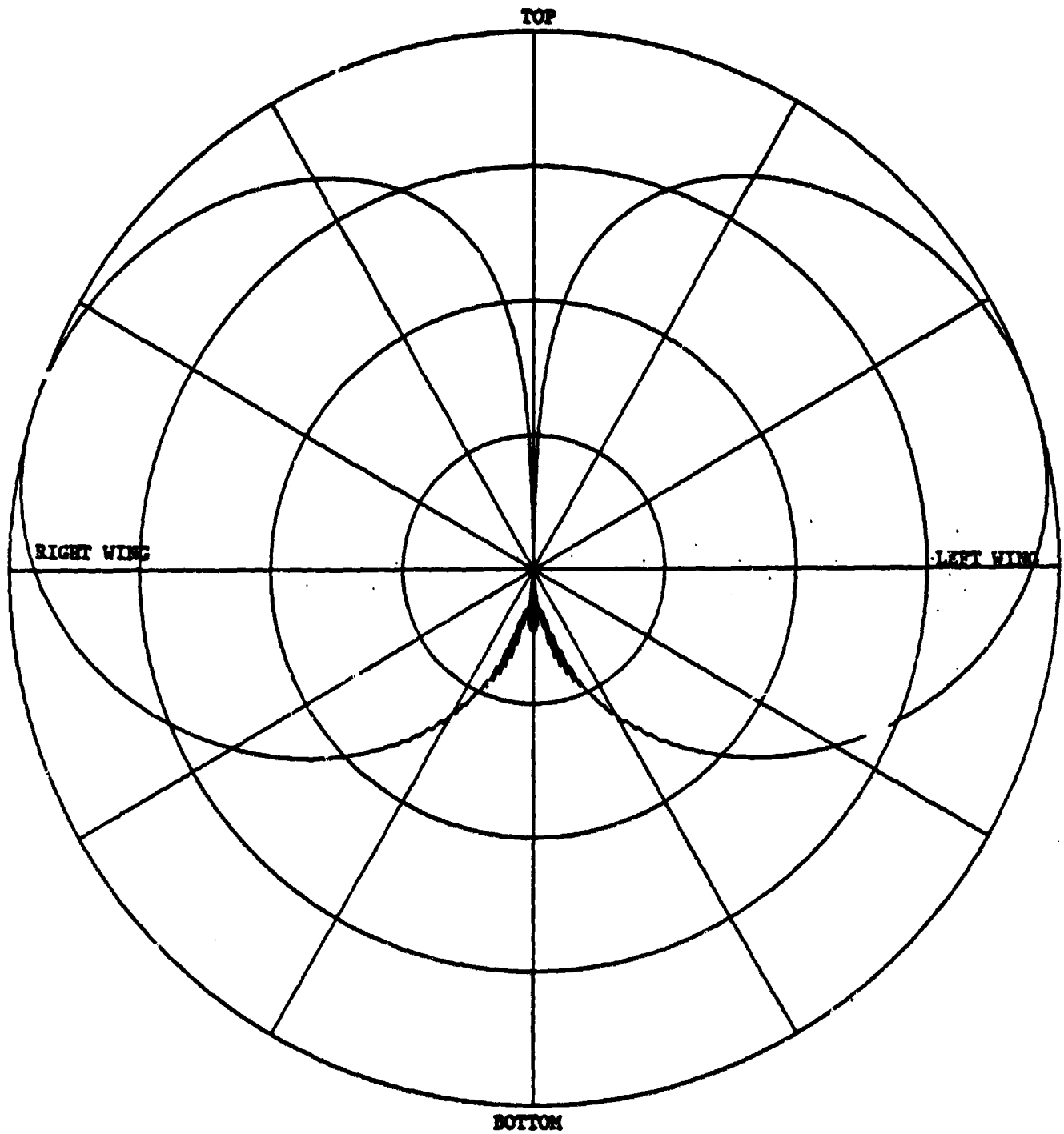
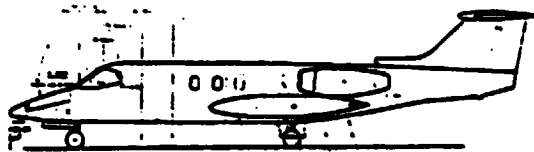


Figure II.94-3. Lear Jet. Roll plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	30.5	30.	30.5	30.
C.	0.	0.		
SG				
1				
	0.	22.45		
	0.	0.	0.	.25 3
	1.	0.		
PD				
	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP				
	3.75	3		
EX				

Figure II.95-1. Lear Jet. Data set for antenna location 2.



1/4  
WAVELENGTH  
MONOPOLE ANTENNA

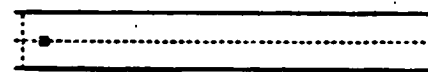
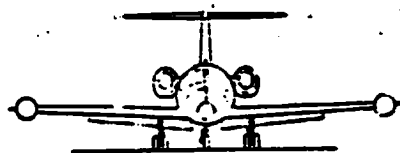
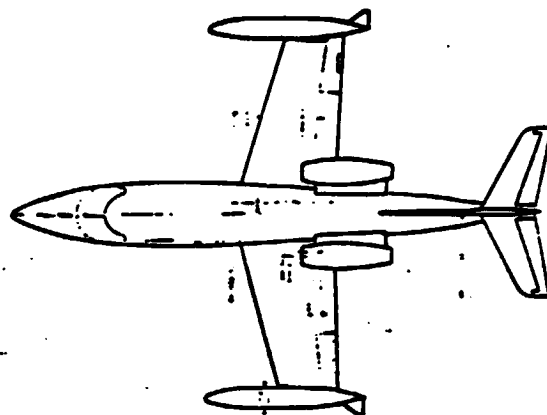
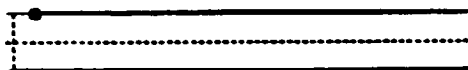


Figure II.95-2. Lear Jet. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

C-4

E-PHI  
DB PLOT

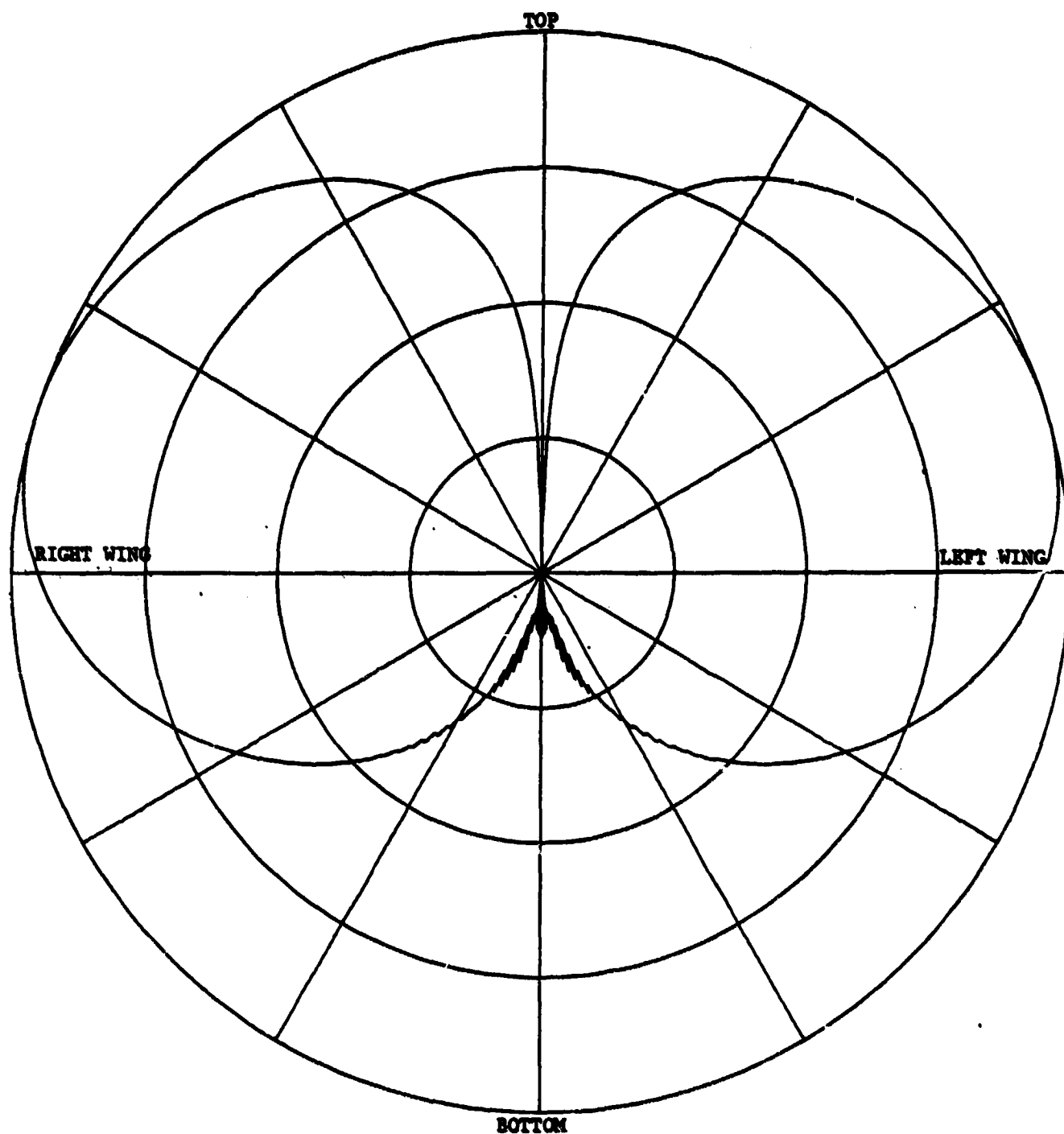


Figure II.95-3. Lear Jet. Roll plane pattern for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
27. 25. 26. 25.
0. 0. 0.
PG
4 T
6.286 -18.858 68.248
6.286 -57.472 68.248
6.286 -57.472 -30.532
6.286 -18.858 -30.532
PG
4 F
18.858 -192.172 37.716
18.858 -221.806 37.716
18.858 -196.662 8.98
18.858 -185.886 8.98
PG
4 T
6.286 18.858 -30.532
6.286 57.472 -30.532
6.286 57.472 68.248
6.286 18.858 68.248
PG
4 F
18.858 185.886 8.98
18.858 196.662 8.98
18.858 221.806 37.716
18.858 192.172 37.716
SG
1
0. 22.45
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 I
50000. 5.2
PP
3.75 3
EX

```

Figure II.96-1. Lear Jet. Data set for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

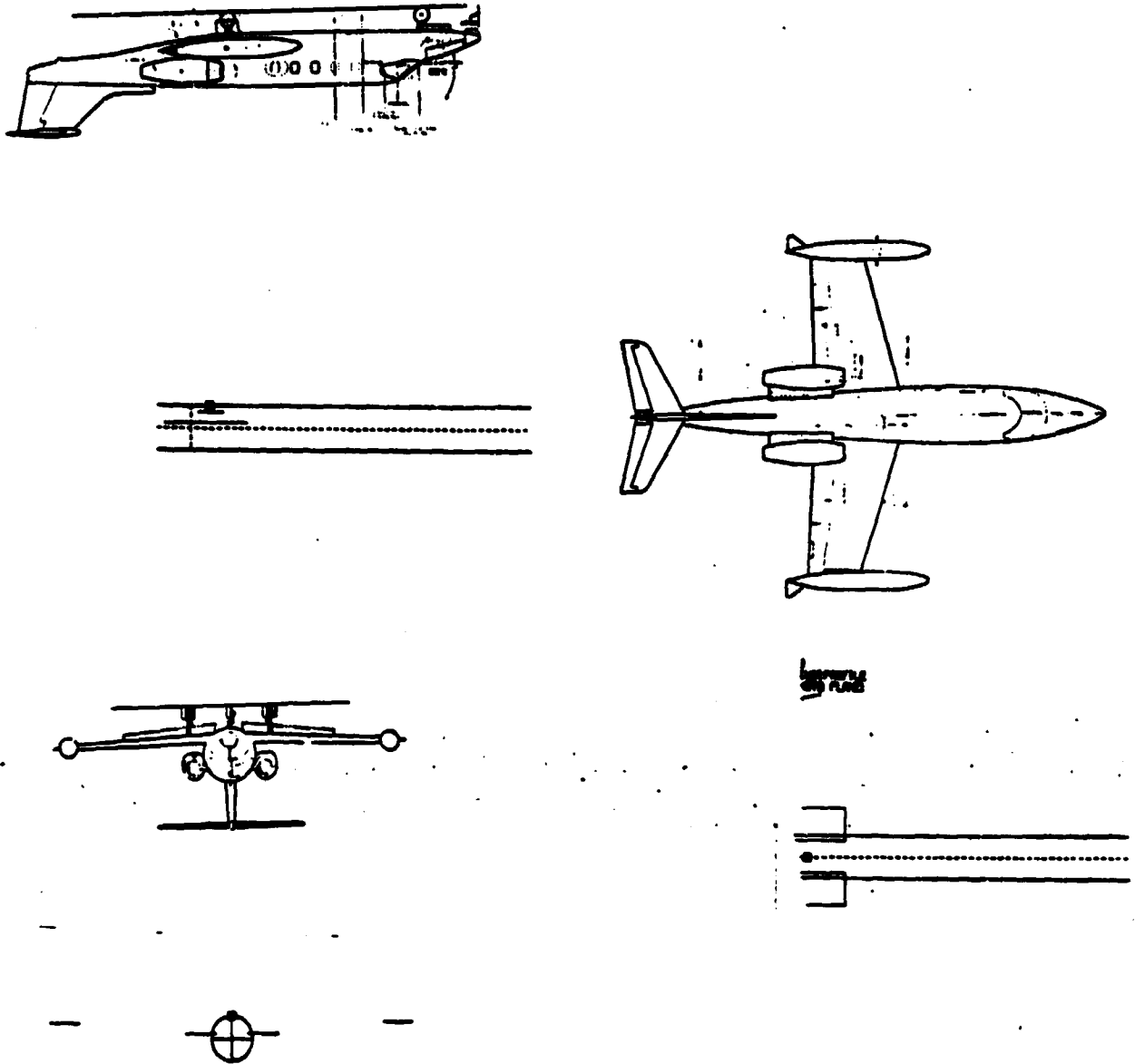


Figure II.96-2. Lear Jet. Bottom rear 1/4 wavelength monopole antenna for antenna location 3.



E-PHI  
DB PLOT

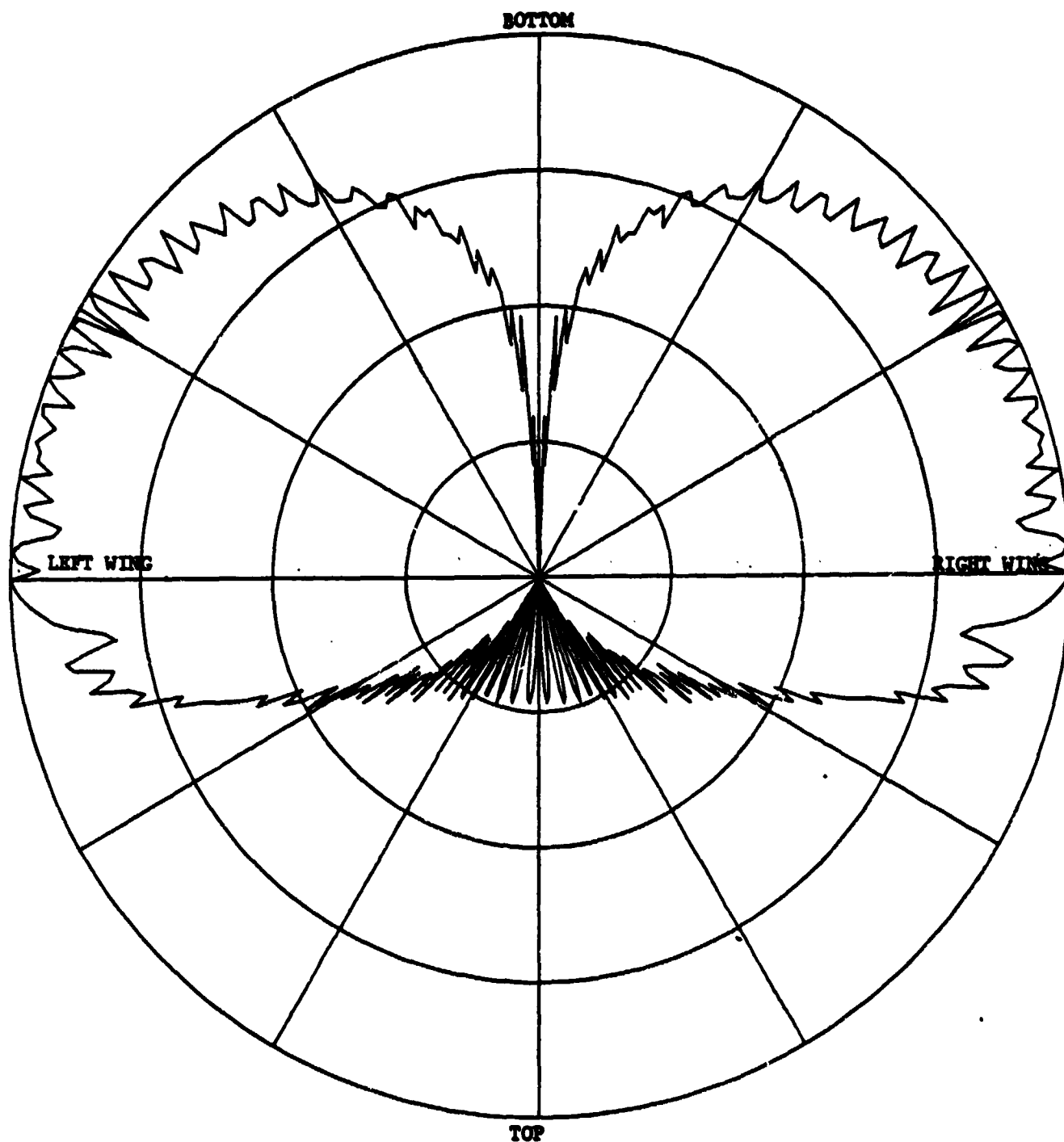


Figure II.96.3. Lear Jet. Roll plane pattern for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

```

FG
27. 25. 26. 25.
0. 0. 0.
PG
4 T
6.286 -18.858 68.248
6.286 -57.472 68.248
6.286 -57.472 -30.532
6.286 -18.858 -30.532
PG
4 T
6.286 18.858 -30.532
6.286 57.472 -30.532
6.286 57.472 68.248
6.286 18.858 68.248
SG
1
0. 22.45
0. 0. 0. .25 3
1. 0.
PD
0. 0. 90.
0 360 1
50000. 5.2
PP
3.75 3
EX

```

Figure II.97-1. Lear Jet. Data set modeled without fuel tanks  
for antenna location 3.

E-PHI  
DB PLOT

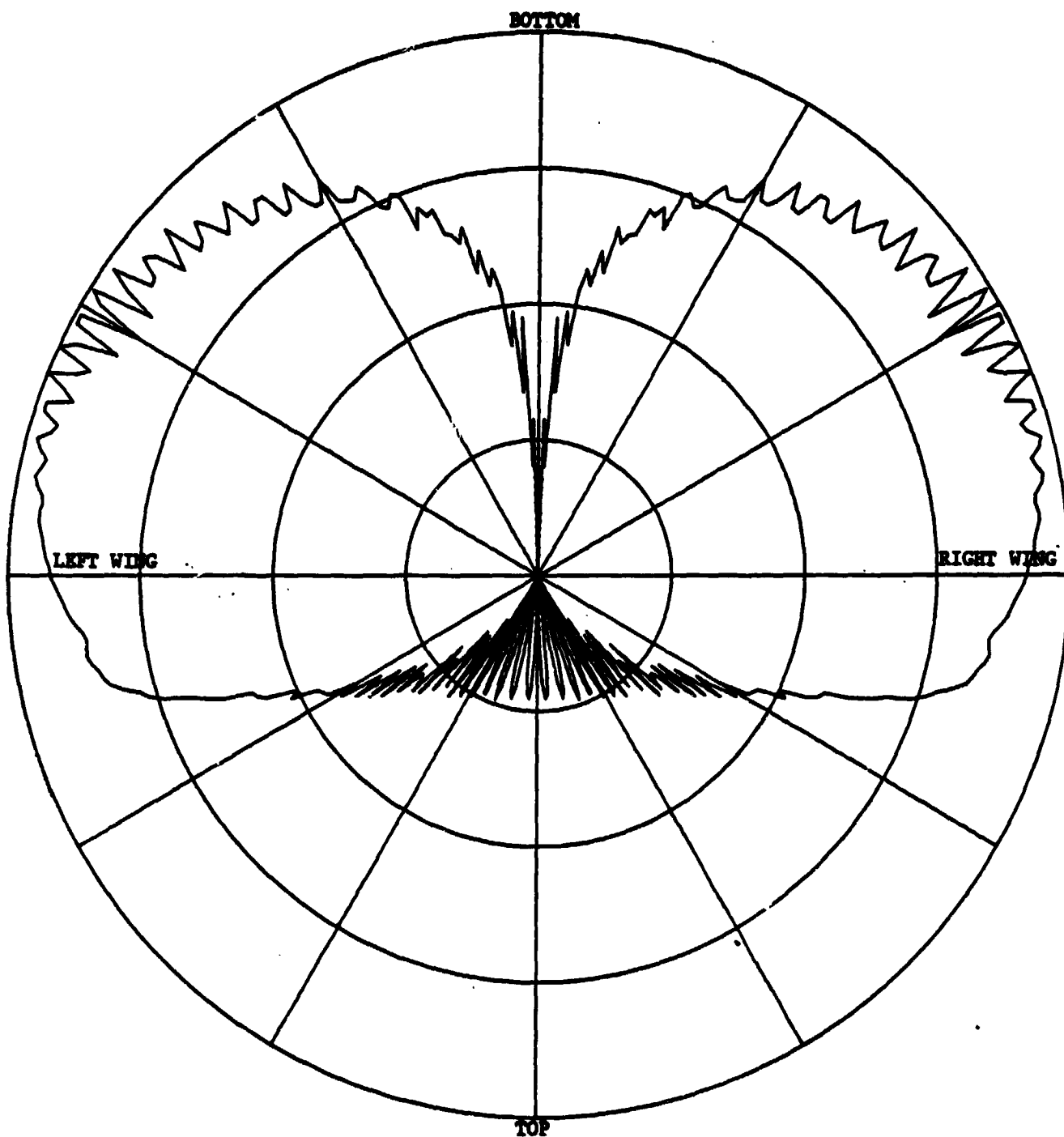
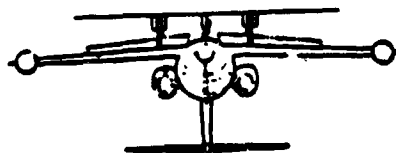
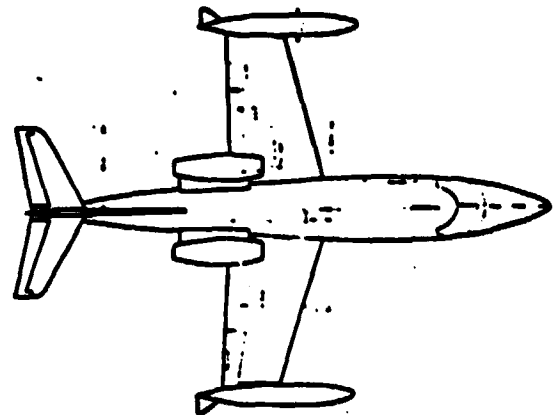
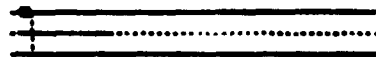
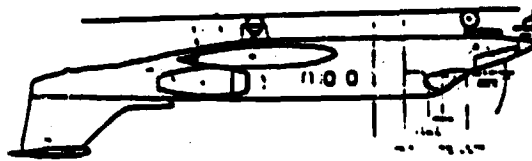


Figure II.97-2. Lear Jet. Roll plane pattern for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	23. 22. 23. 22.
	0. 0. 0.
PG	4 T
	0. -19.756 84.412
	0. -52.982 84.412
	0. -52.982 -14.368
	0. -19.756 -14.368
PG	4 T
	0. 19.756 -14.368
	0. 52.982 -14.368
	0. 52.982 84.412
	0. 19.756 84.412
SG	1
	0. -8.
	0. 0. 0. .25 3
	1. 0.
PD	0. 0. 90.
	0 360 1
	50000. 5.2
PP	3.75 3
EX	

Figure II.98-1. Lear Jet. Data set for antenna location 4.



100-100-100

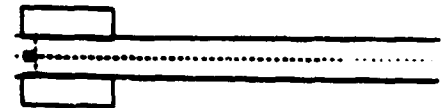


Figure II.98-2. Lear Jet. Bottom rear 1/4 wavelength monopole antenna for antenna location 4.

E-PHI  
DB PLOT

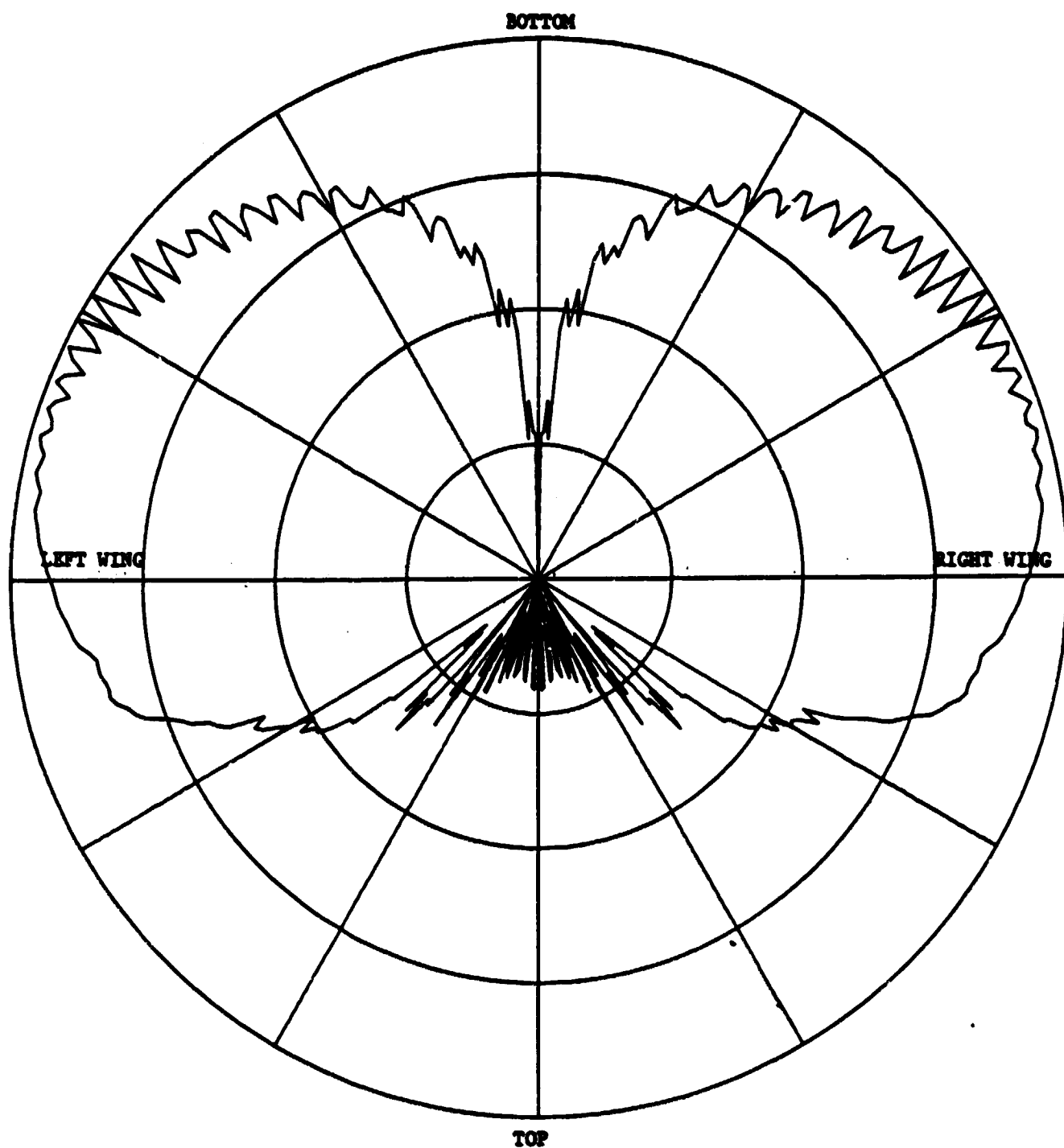


Figure II.98-3. Lear Jet. Roll plane pattern for antenna location 4.

#### II.12. Twin Otter DHC-6

Roll plane patterns are calculated for six particular antenna locations of this aircraft.

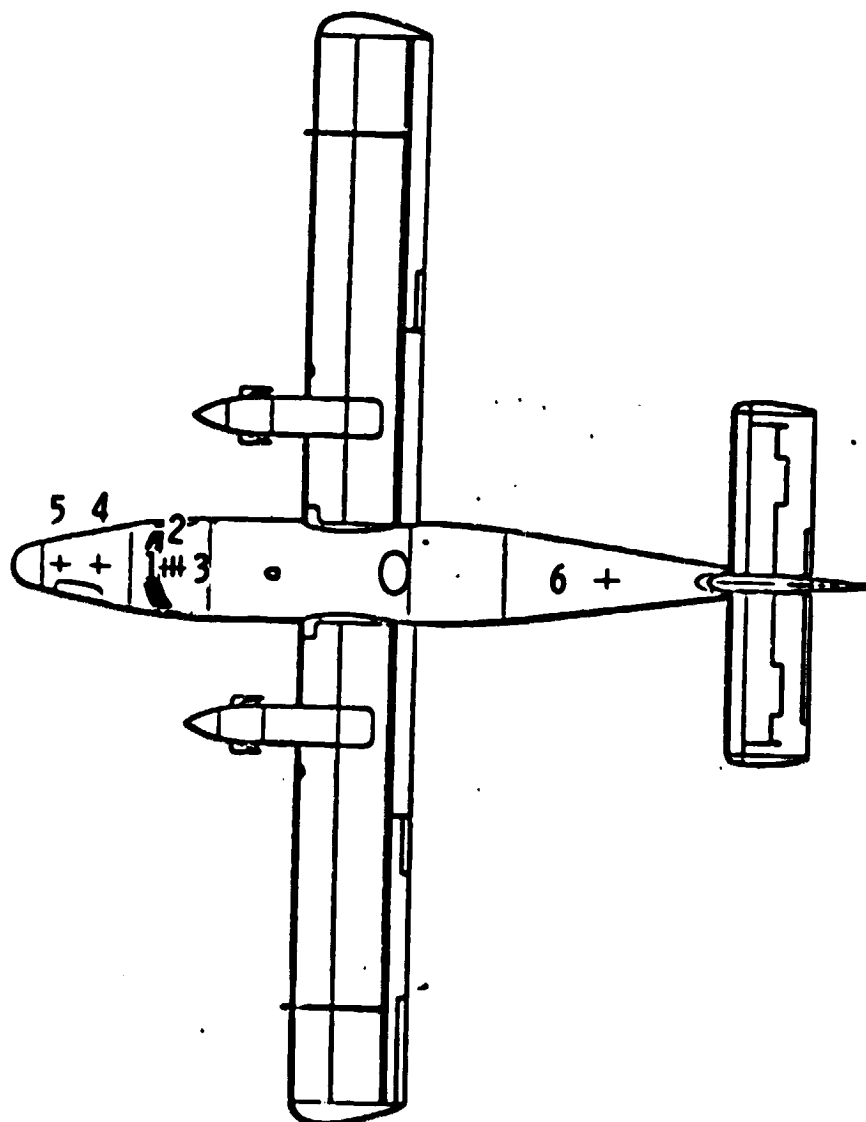
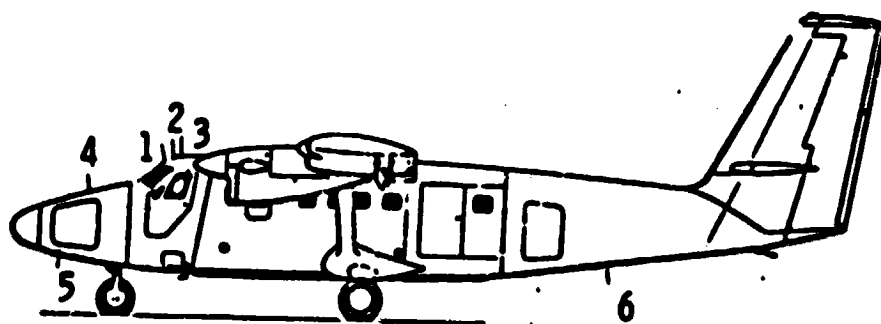


Figure II.99. Twin Otter DHC-6. Antenna locations.



ORIGINAL PAGE IS  
OF POOR QUALITY

```
FG
10.655 19.00 72.687 39.00
0. 0. 0.
SG
1
0. -33.041
0. 0. 0. .25 3
1. 0.
PN
0. 0. 90.
0 360 1
50000, 5.2
PP
3.75 3
EX
```

Figure II.100-1. Twin Otter DEC-6. Data set for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

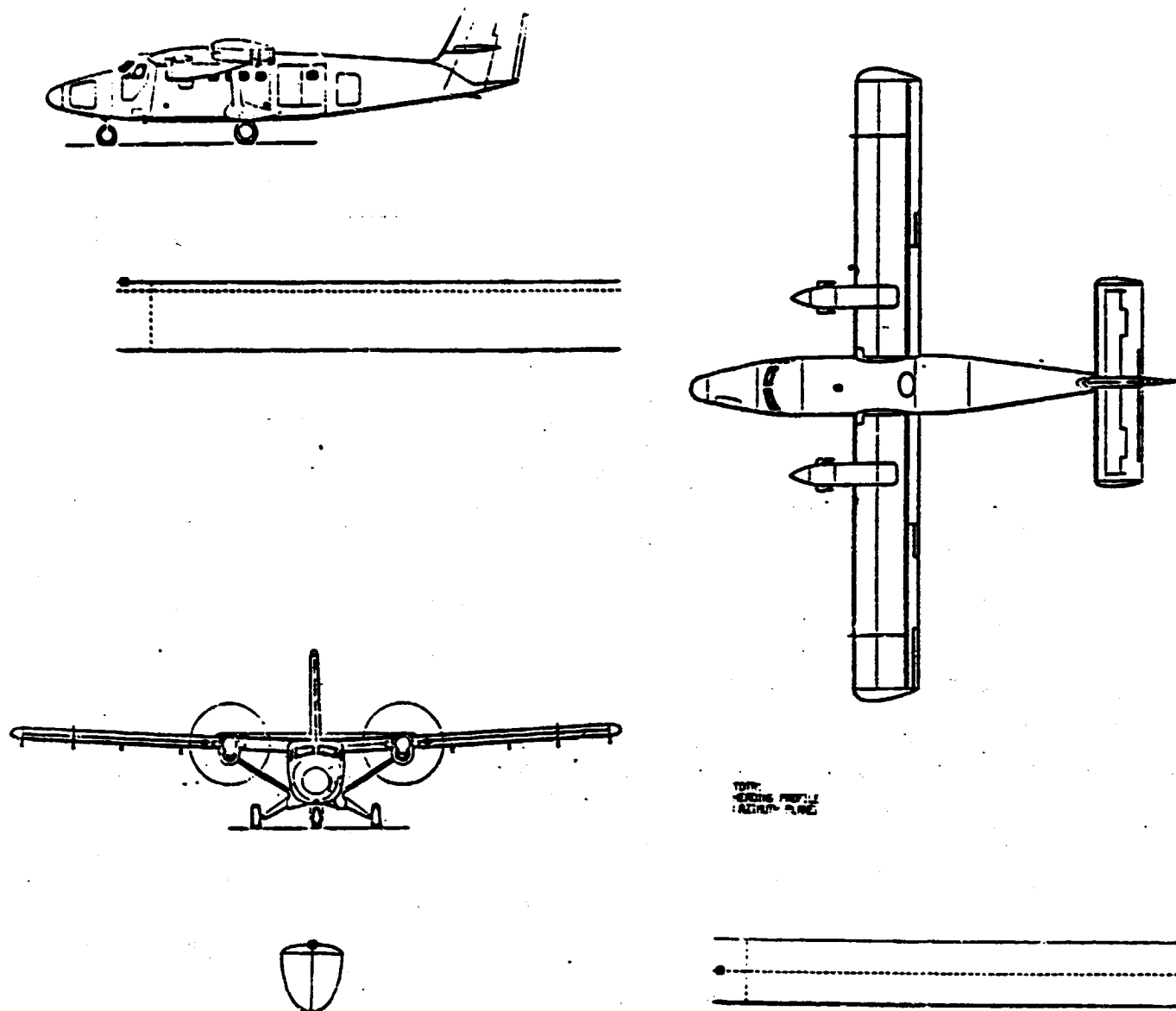


Figure II.100-2. Twin Otter DHC-6. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 1.

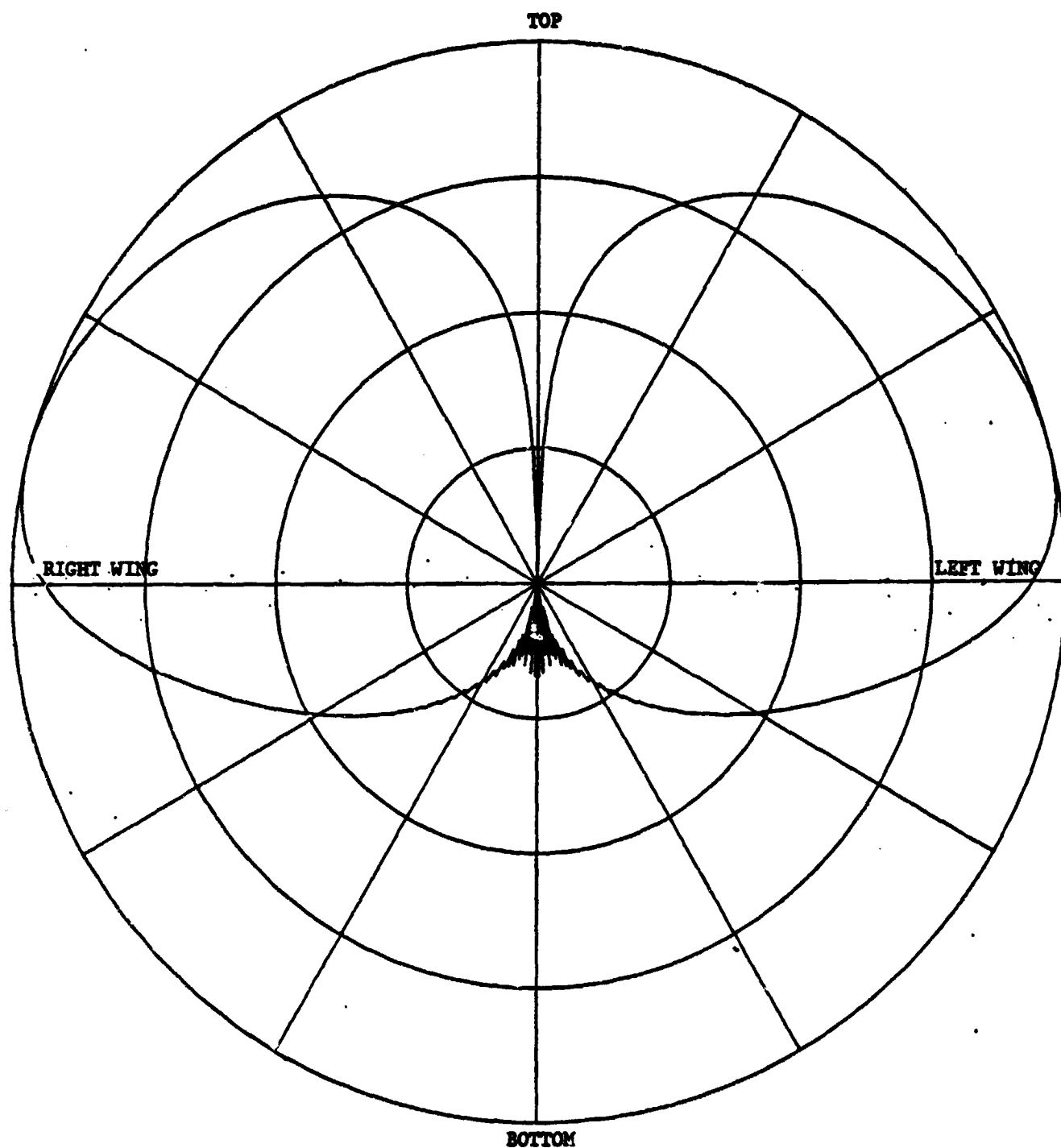


Figure II.100-3. Twin Otter DHC-6. Roll plane pattern for antenna location 1.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	11.865	39.00	73,777	39.00
	0.	0.	0.	
CG				
1				
	0.	-29.469		
	0.	0.	0.	.25 3
	1.	0.		
PD				
	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP				
	3.75	3		
EX				

Figure II.101-1. Twin Otter DHC-6. Data set for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

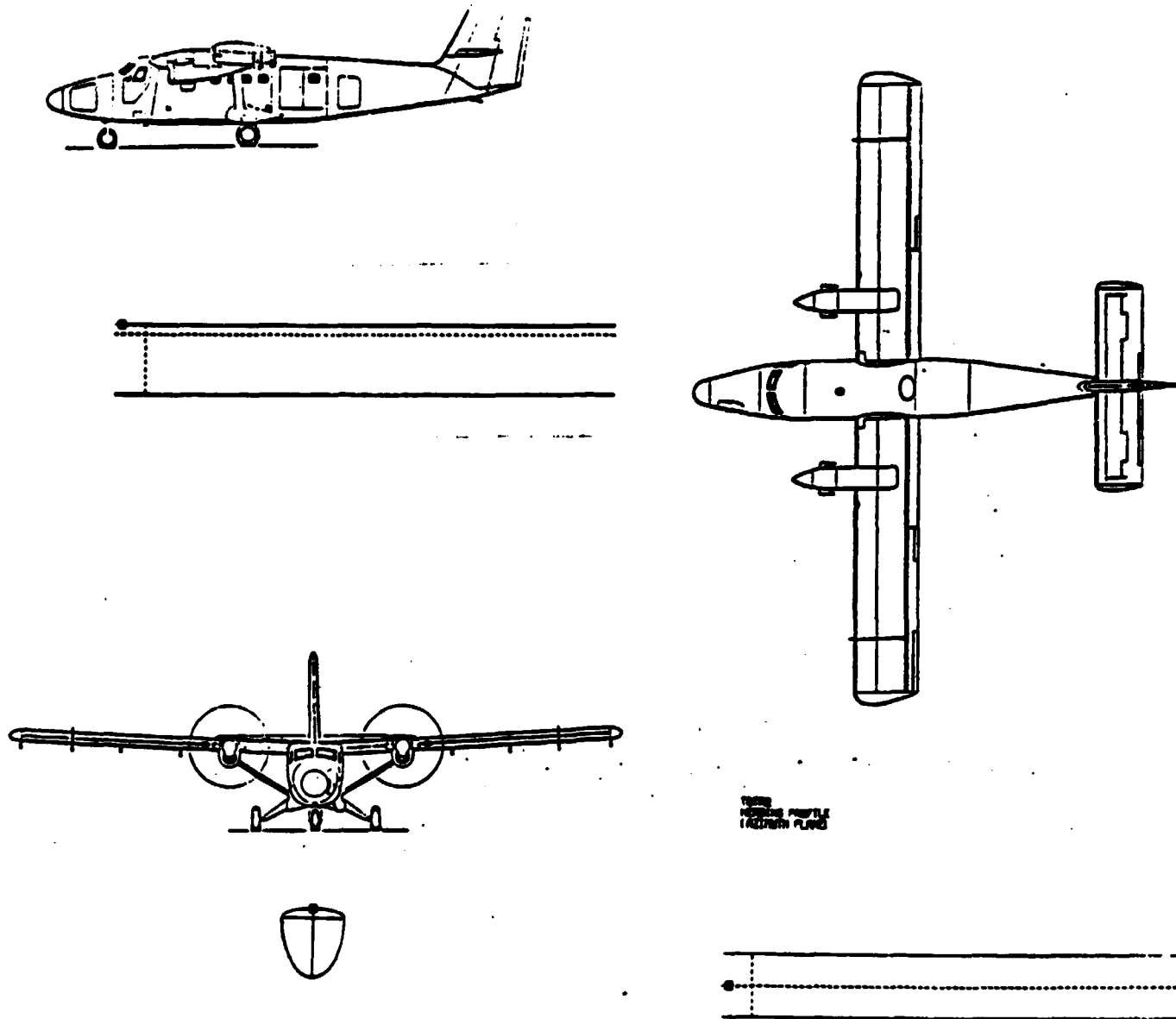


Figure II.101-2. Twin Otter DHC-6. Top front 1/4 wavelength monopole antenna above cockpit for antenna location 2.

E-PHI  
DB PLOT

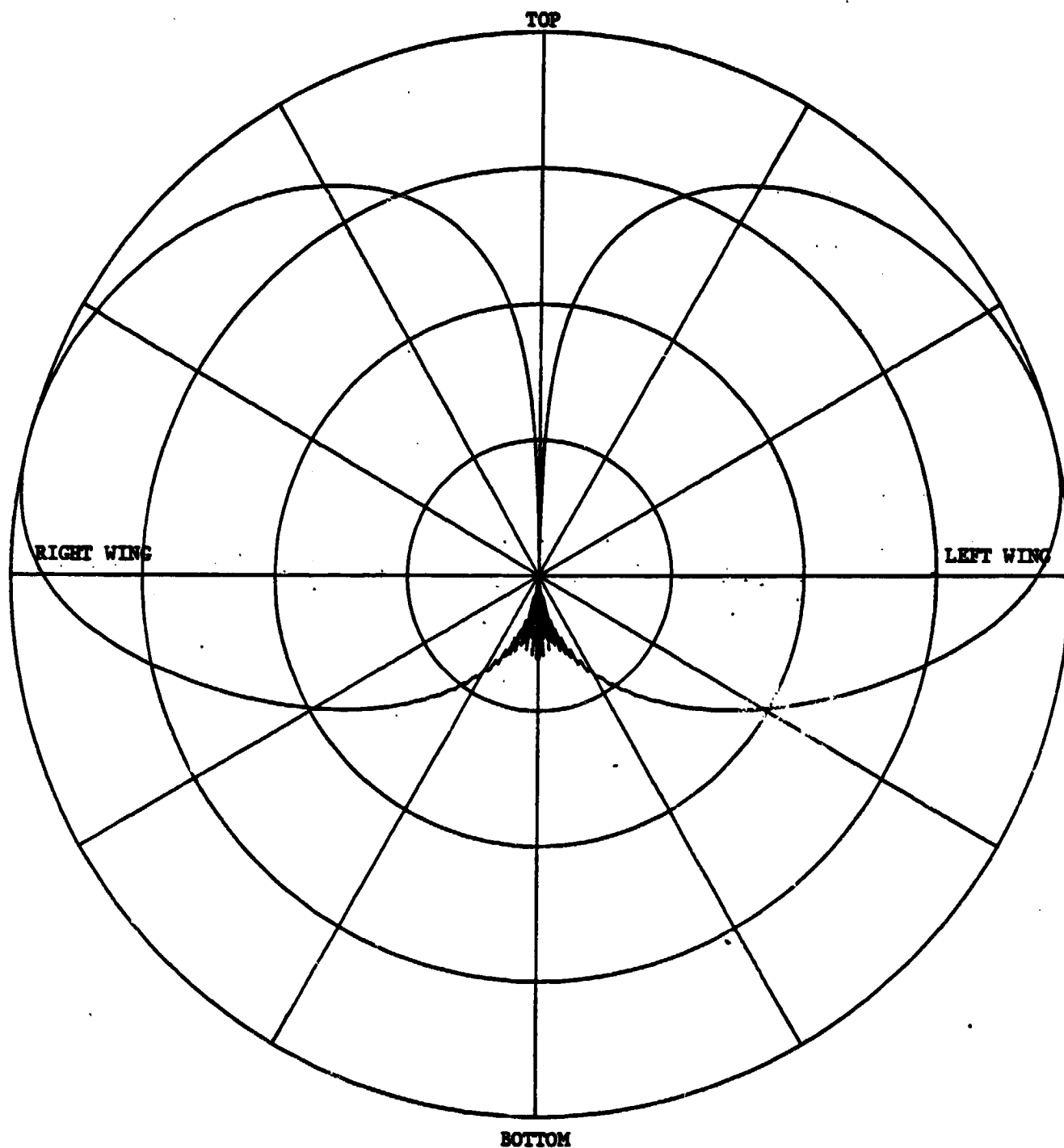


Figure II.101-3. Twin Otter DHC-6. Roll plane pattern for antenna location 2.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	11.055	39.00	74.607	39.00
	0.	0.	0.	
SG				
1				
	0.	-24.111		
	0.	0.	0.	.25 3
	1.	0.		
PD				
	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP				
	3.75	3		
EX				

Figure II.102-1. Twin Otter DHC-6. Data set for antenna location 3.

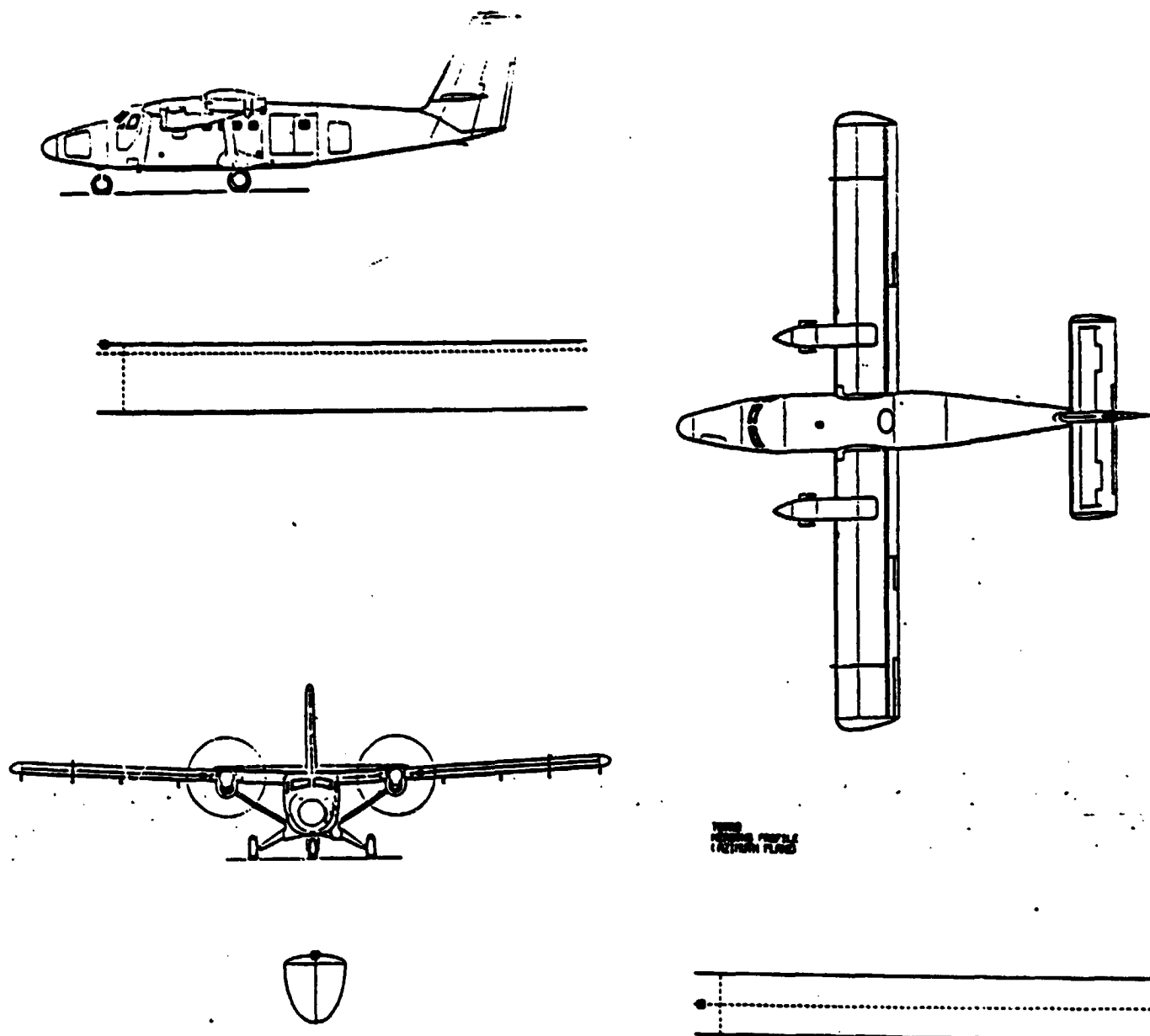


Figure II.102-2. Twin Otter DHC-6. Top front  $1/4$  wavelength monopole antenna above cockpit for antenna location 3.



E-PHI  
DB PLOT

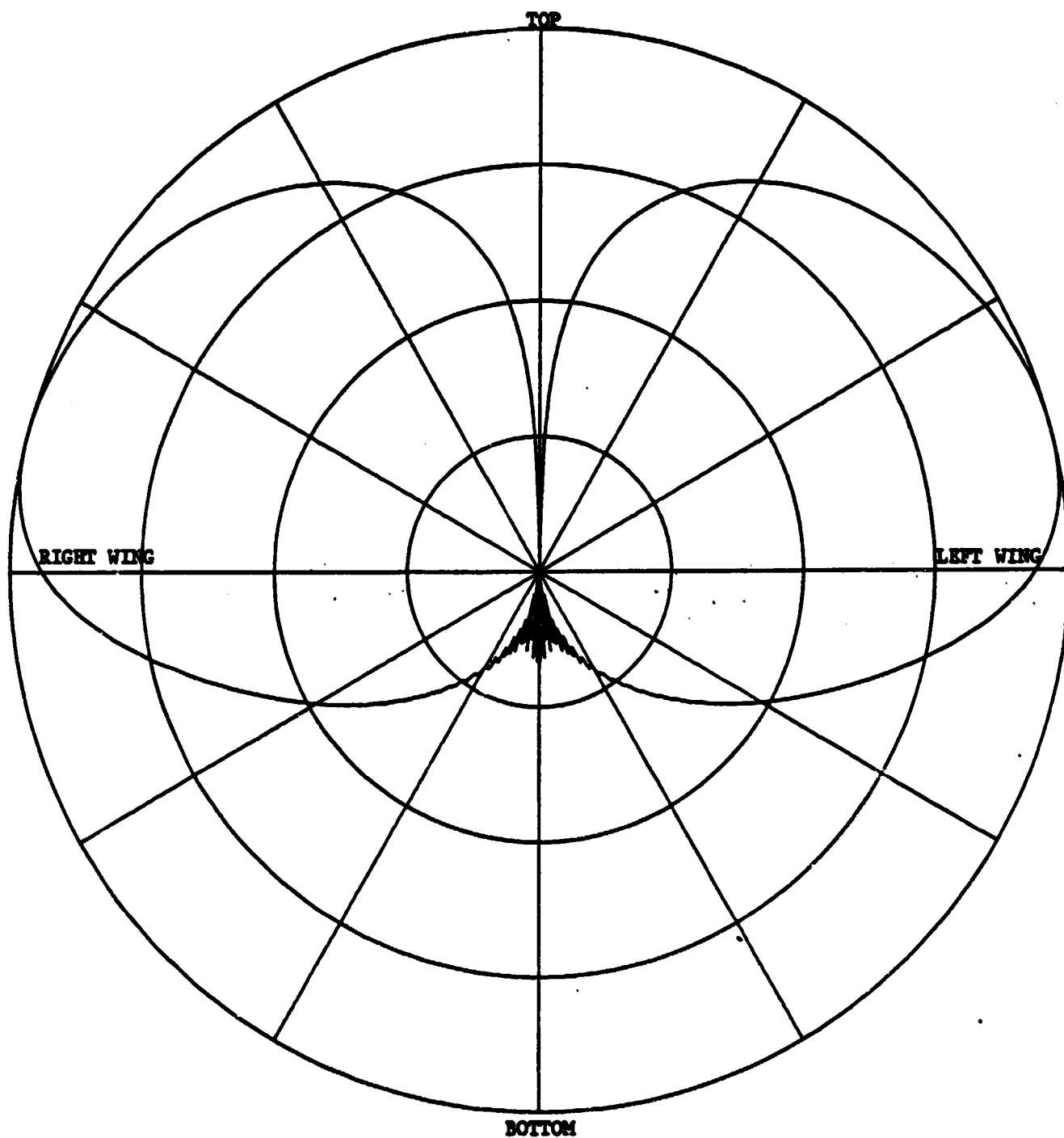


Figure II.102-3. Twin Otter DHC-6. Roll plane pattern for antenna location 3.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	23.00	23.00	23.00	23.00
	0.	0.	0.	
SG				
1				
	0.	-33.041		
	0.	0.	0.	.25 3
	1.	0.		
PD				
	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP				
	3.75	3		
EX				

Figure II.103-1. Twin Otter DHC-6. Data set for antenna location 4.

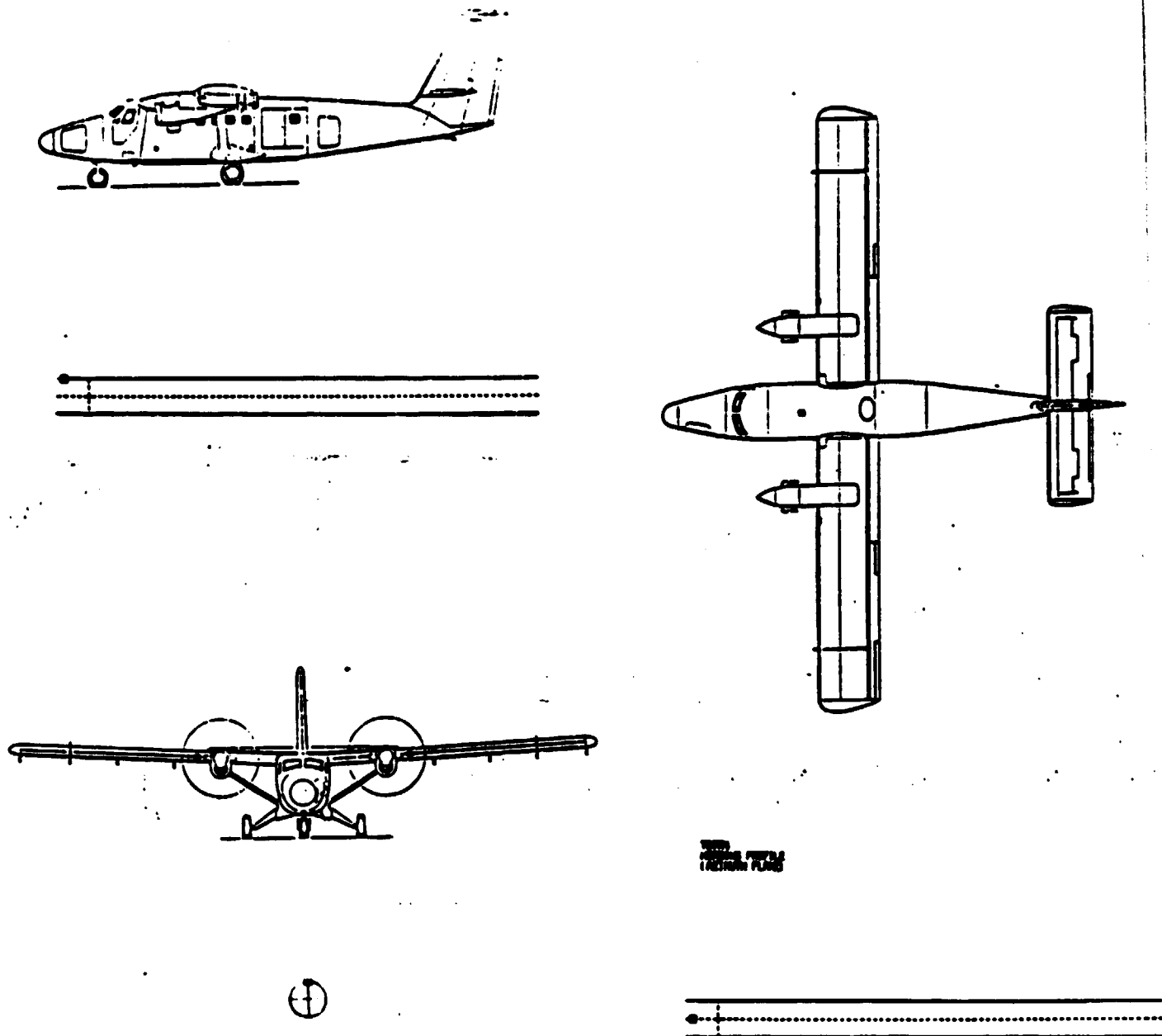


Figure II.103-2. Twin Otter DHC-6. Top front  $1/4$  wavelength monopole antenna forward of cockpit for antenna location 4.

E-PHI  
DB PLOT

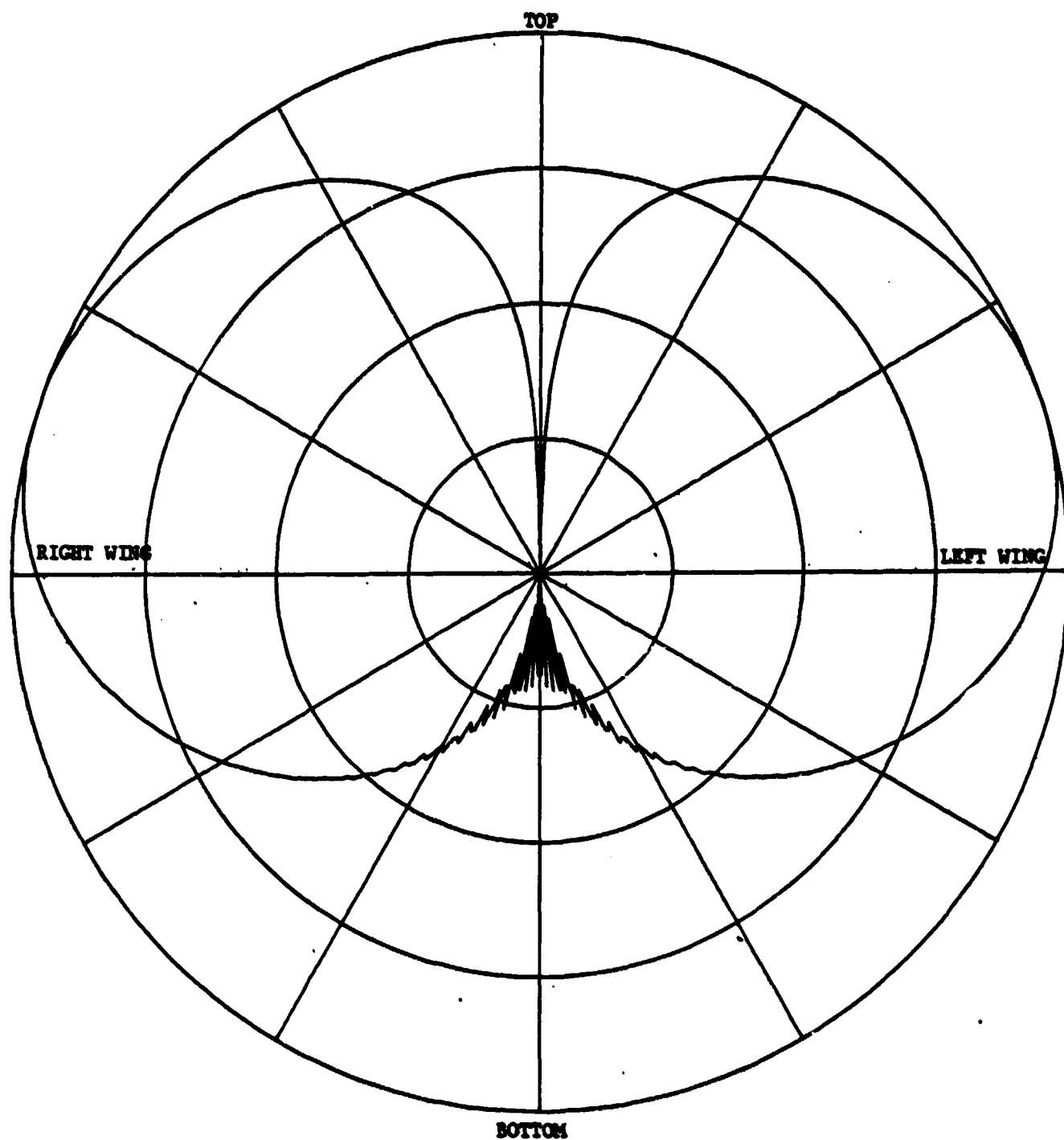


Figure II.103-3. Twin Otter DHC-6. Roll plane pattern for antenna location 4.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG	20.00	20.00	20.00	20.00
	0.0	0.0		
SG				
1				
	0.	-33.041		
	0.	0.0	-122.1	
	1.	0.		
PD				
	0.	0.	90.	
	0	360	1	
	90000.	1.2		
PP				
	3.72	3		
EX				

Figure II.104-1. Twin Otter DBC-6. Data set for antenna location 5.

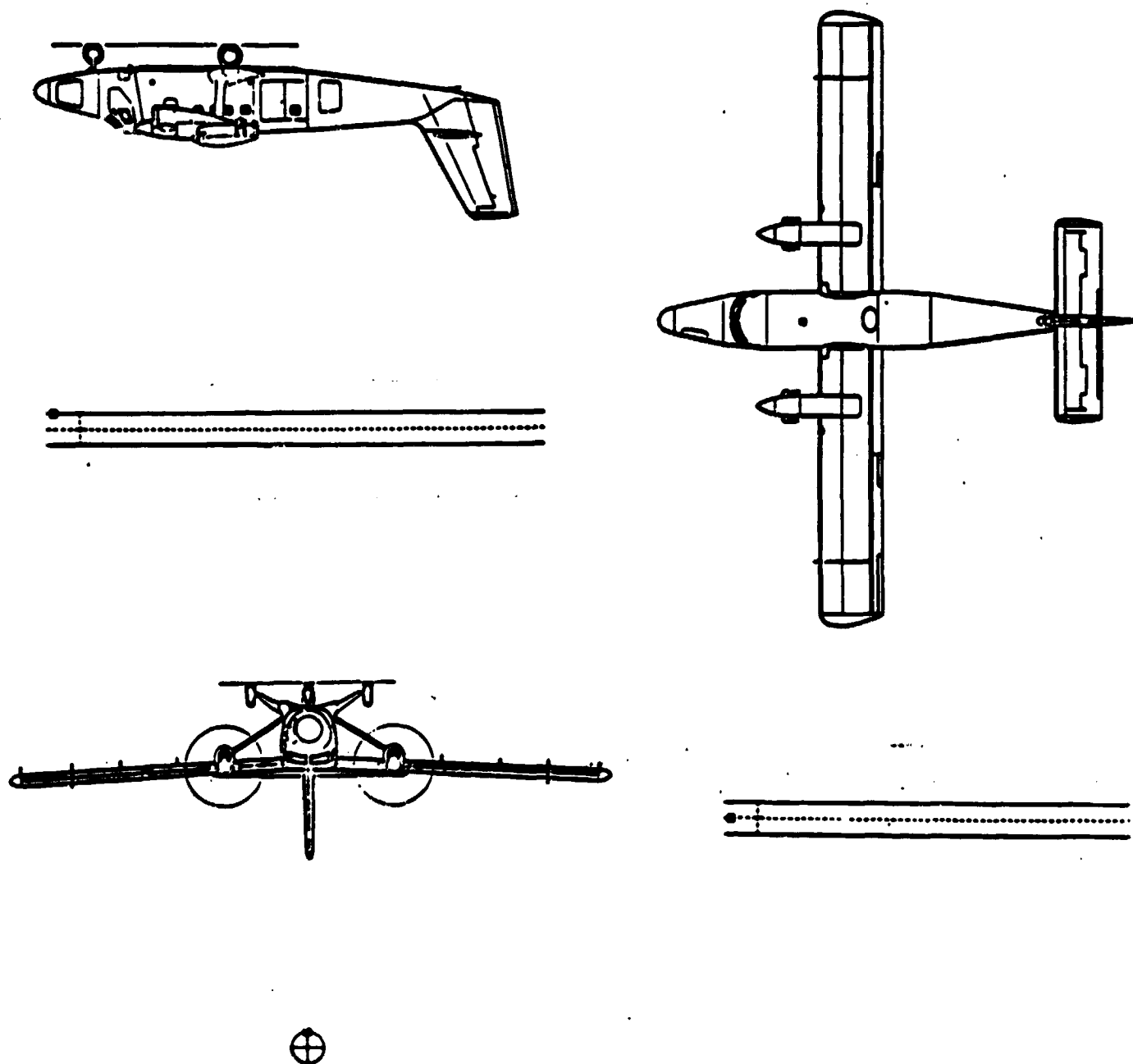


Figure II.104-2. Twin Otter DHC-6. Bottom front 1/4 wavelength monopole antenna for antenna location 5.

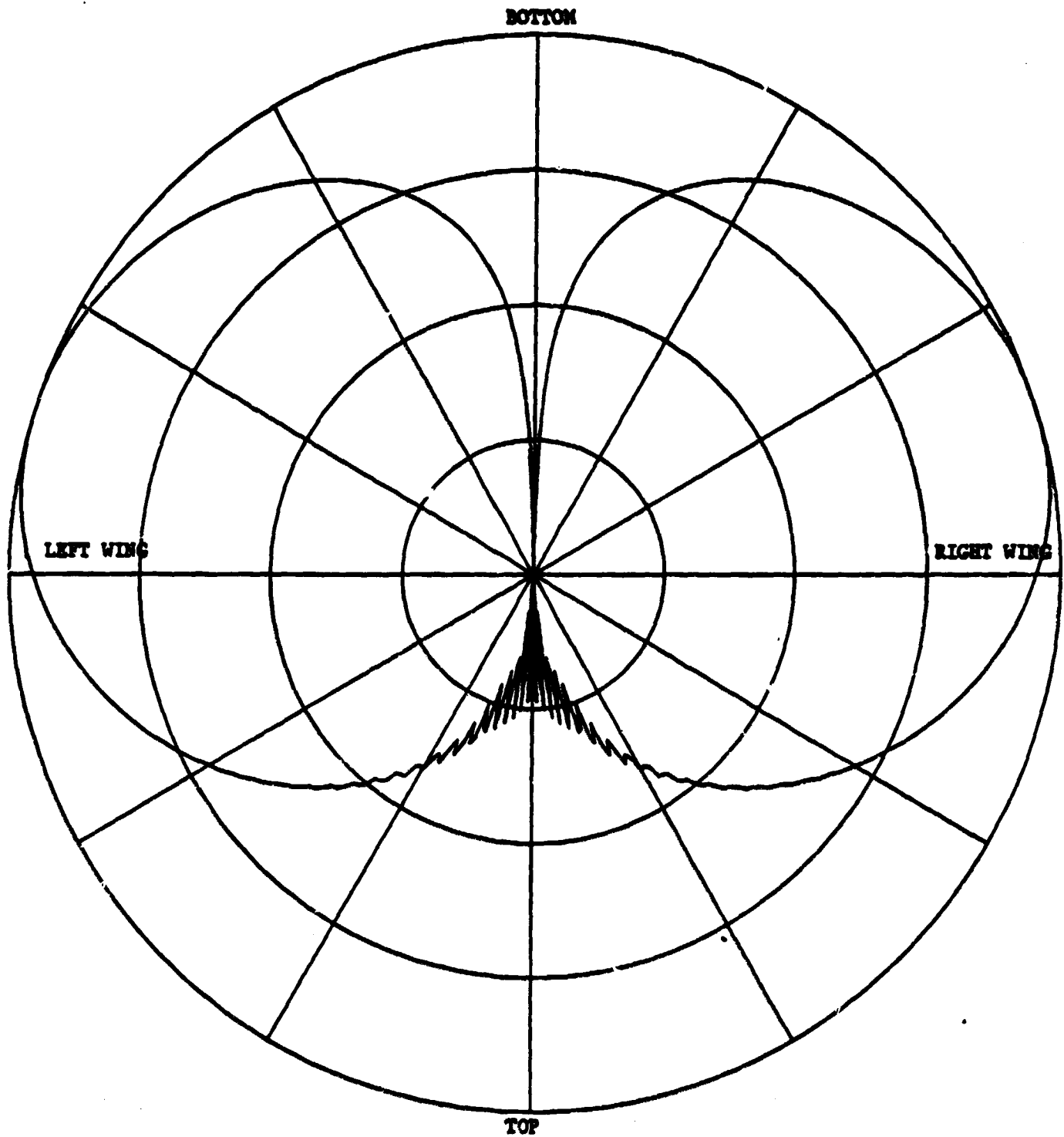


Figure II.104-3. Twin Otter DHC-6. Roll plane pattern for antenna location 5.

ORIGINAL PAGE IS  
OF POOR QUALITY

FG				
	30.00	23.00	30.00	23.00
	0.	0.	0.	
SG				
	1			
	0.	-33.041		
	0.	0.	0.	.22 3
	1.	0.		
PD				
	0.	0.	90.	
	0	360	1	
	50000.	5.2		
PP				
	3.75	3		
EX				

Figure II.105-1. Twin Otter DHC-6. Data set for antenna location 6.



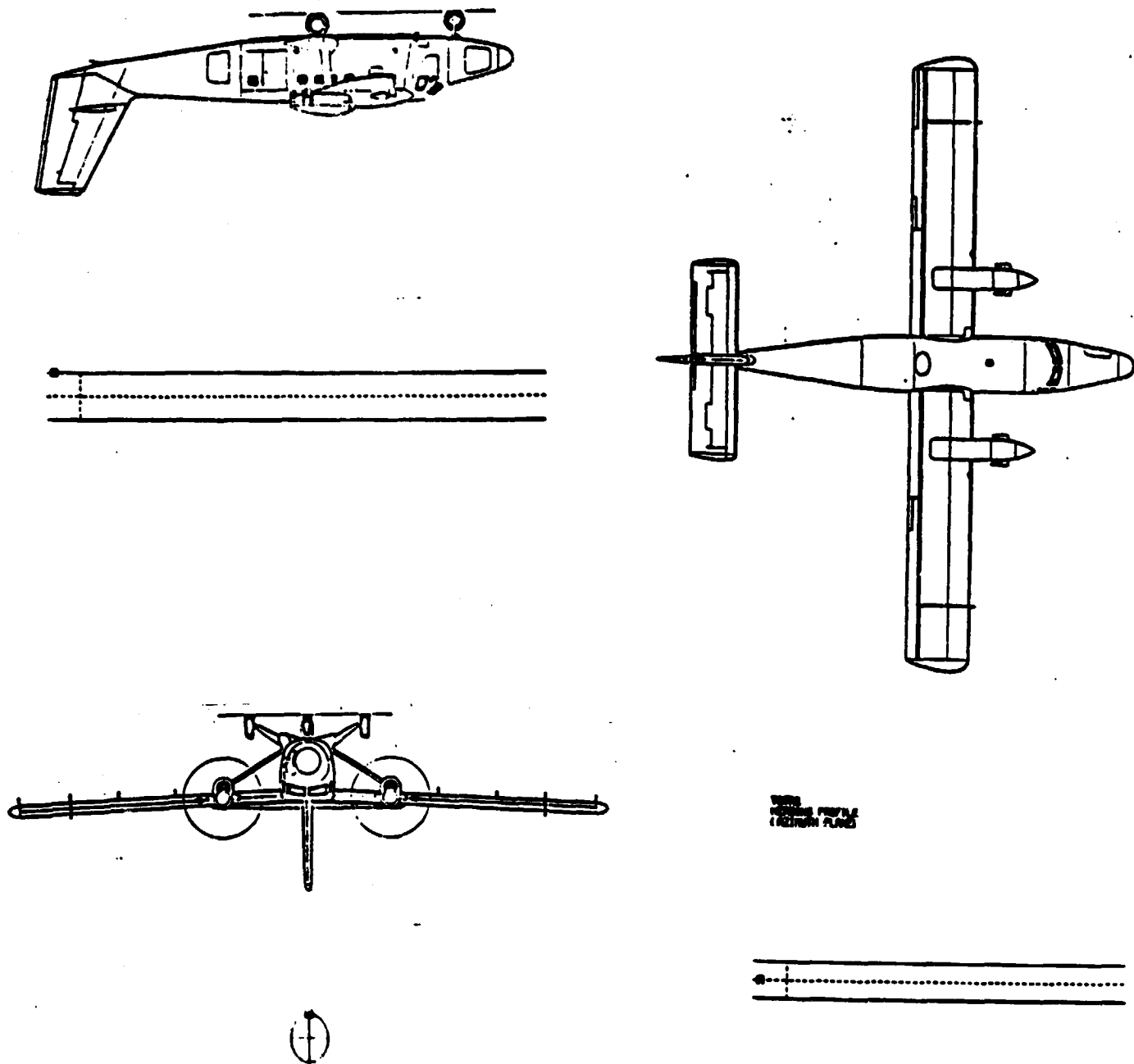


Figure II.105-2. Twin Otter DHC-6. Bottom rear 1/4 wavelength monopole antenna for antenna location 6.

E-PHI  
DB PLOT

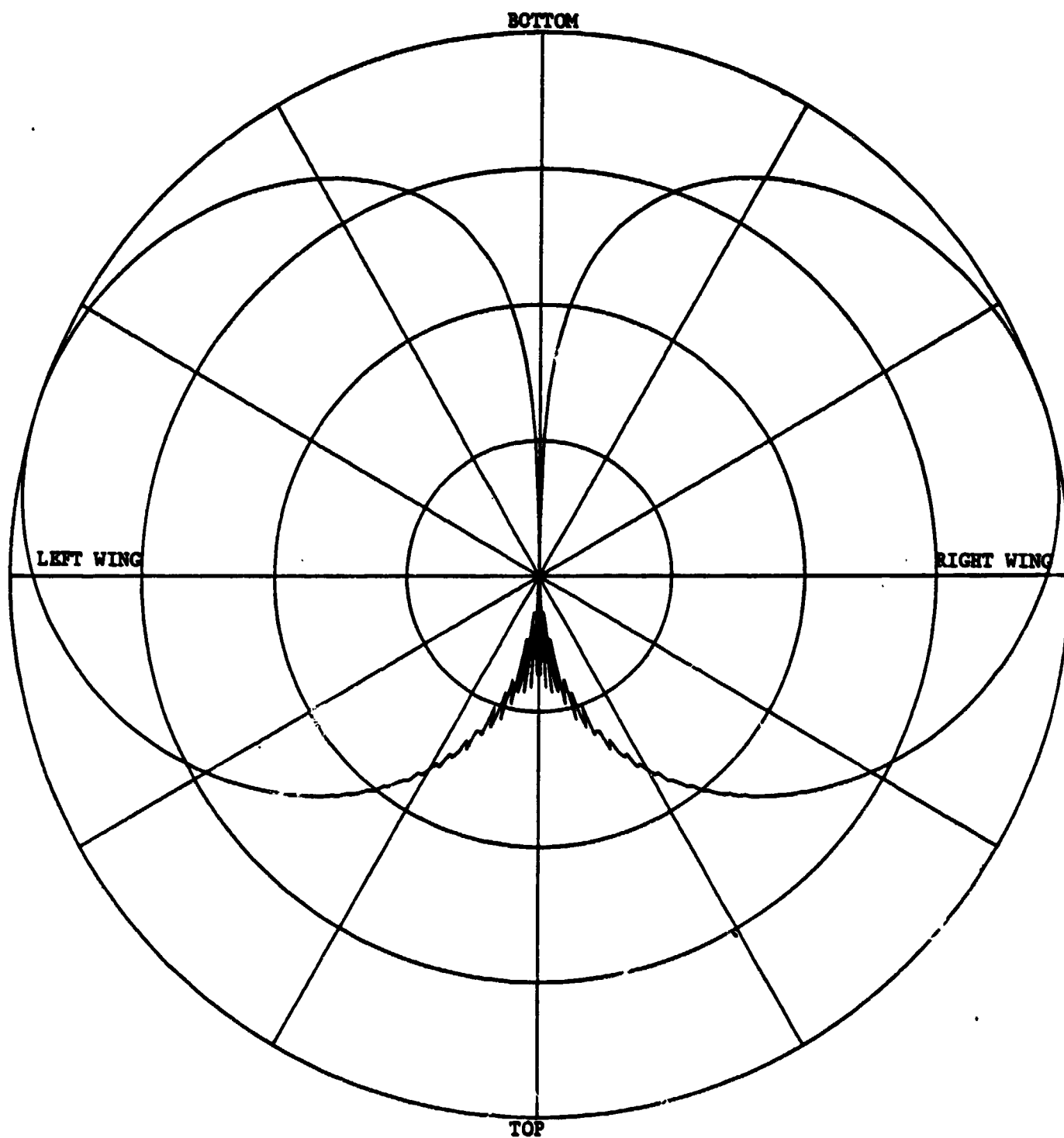


Figure II.105-3. Twin Otter DHC-6. Roll plane pattern for antenna location 6.

## REFERENCES

1. Knerr, Timothy J.; and Mielke, Roland R.: Airborne Antenna Pattern Calculations. Final Report, NASA Grant NSG-1655, Nov. 1980.
2. Chu, Tai-Tseng; and Mielke, Roland R.: A Study of Antenna Locations on Commercial Aircraft to Meet the Microwave Landing System Requirements. Final Report, NASA Master Contract Agreement NAS1-14193, Task Authorization No. 25, Sept. 1977.
3. Schaffner, Philip R.; and Mielke, Roland R.: Volumetric Pattern Calculations for Fuselag-Mounted Airborne Antennas. Final Report, NASA Master Contract Agreement NAS1-14193, Task Authorization No. 45, Nov. 1978.
4. Schaffner, Philip R.; and Mielke, Roland R.: A Study of Antenna Locations on Commercial Aircraft to Meet the Microwave Landing System Requirements: Program MODGEN. Final Report, NASA Master Contract Agreement NAS1-14193, Task Authorization No. 63, Jan. 1979.
5. Schaffner, Philip R.; Knerr, Timothy J.; and Mielke, Roland R.: Volumetric Pattern Calculations for Fuselage-Mounted Airborn Antennas. Final Report, NASA Master Contract Agreement NAS1-14193, Task Authorization No. 69, Aug. 1979.
6. Knerr, Timothy J.; Schaffner, Philip R.; and Mielke, Roland R.: Volumetric Pattern Calculations for Fuselage-Mounted Airborne Antennas. Final Report, NASA Master Contract Agreement NAS1-15648 Task Authorization No. 8, Nov. 1979.